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# HOW GREECE DEVELOPED its AGRICULTURE 1947-67



Foreign Agricultural Economic Report No.67  
ECONOMIC RESEARCH SERVICE • U.S. DEPARTMENT OF AGRICULTURE



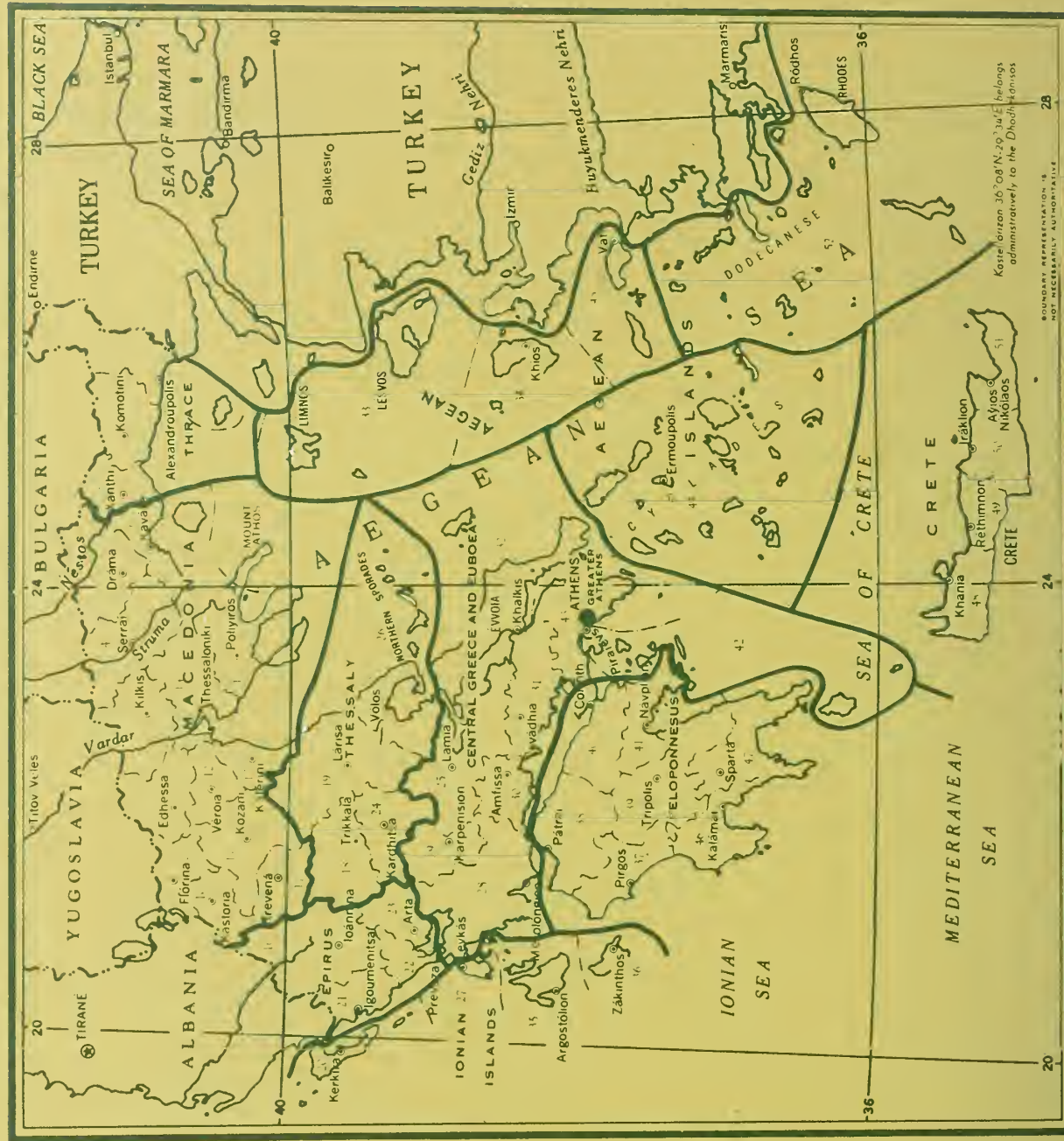
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\*Includes the autonomous areas, Ayion Oros (Mt Athos)

## GREECE

- Nomes boundary
- Nomes administrative center
- Geographic region boundary



HOW GREECE DEVELOPED ITS AGRICULTURE

1947-67

By

D.C. Myrick and

Lawrence A. Witucki

Foreign Development and Trade Division

Economic Research Service  
United States Department of Agriculture

Foreign Agricultural Economic  
Report No. 67

Washington, D. C. 20250

February 1971

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For sale by the Superintendent of Documents, U.S. Government Printing Office  
Washington, D.C. 20402 - Price \$1.25

## ABSTRACT

From 1947 to 1967, the agricultural output of Greece grew at a compound annual rate of 4.9 percent, meeting the needs of increased population and rising levels of living, accomplishing import substitution, and increasing exports. With little opportunity to expand agricultural land, Greece achieved most of the growth from intensification. The proportion of capital to all inputs increased from 19.5 to 38.3 percent, and the proportion of cropland irrigated, from 7 to almost 17 percent. Improved technology was developed and widely disseminated. A favorable economic environment was provided by price supports, bonuses, and subsidies, which -- together with investment support -- involved substantial capital and income transfers from the general economy. Massive external assistance through 1952, and at reduced levels until 1965, was a major factor in growth of the Greek economy. Population grew at only 0.8 percent, but the proportion of population in agriculture was high, about 50 percent. Labor productivity in agriculture was low, as reflected by the proportion of gross domestic product originating in the agricultural sector, yet the rest of the economy was not able to provide alternative economic opportunity.

Keywords: Greece, economic development, productivity, agricultural development, and production incentives.

## FOREWORD

To provide increased knowledge for planning and implementing country development programs in the less developed countries, the Agency for International Development (AID) asked the Economic Research Service (ERS) of the U.S. Department of Agriculture (USDA) to conduct research on a project entitled "Factors Associated with Differences and Changes in Agricultural Production in Underdeveloped Countries." Phase 1 of the research was reported in *Changes in Agriculture in 26 Developing Nations, 1948-63* (For. Agr. Econ. Rpt. No. 27, ERS, USDA, Nov. 1965). This was augmented by *Growth of Crop and Livestock Output in 26 Developing Nations, 1948 to 1965* (ERS-Foreign 226, ERS, USDA, July 1968).

Phase 2 of the research involves a detailed analysis for selected countries of the specific relationship between factors and processes of change in agricultural output. The countries selected were Greece, Taiwan, Mexico, Brazil, Colombia, India, and Nigeria. The studies were conducted by agricultural economists of ERS, in cooperation with a research organization in each country.

The observations and understanding of growth of agricultural output and productivity in developing countries gained in this entire research effort have been summarized and interpreted in *Economic Progress of Agriculture in Developing Nations, 1950-68* (For. Agr. Econ. Rpt. No. 59, ERS, USDA, May 1970).

This report on Greece includes a history of agricultural growth and development related to the national policies and programs that provided a favorable environment and to the supporting external assistance.

Development of the agricultural sector was supported by a variety of institutional arrangements, policies, and programs, which constituted what is popularly termed "the package approach." Most notably, development systems and dissemination of technology; the economic environment, including prices, marketing, the supply of inputs, and credit; and land resource development were managed in some degree by the Government. The pattern of external assistance was unusual in that Greece benefited from extensive aid from 1945 through 1955, and this aid continued until 1965 at the more modest scale common to most developing countries today.



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#### ACKNOWLEDGMENTS

The basic production, price, and input series used in this report were collected by Lawrence Shaw, in Greece, March 1964 to March 1966, and in Washington, D. C., a few months after his return. His report has been published in Greece by the Center of Planning and Economic Research. Wade F. Gregory worked further with Shaw on an analysis oriented more specifically to the process of development. The two manuscripts provided the starting point from which this report was developed, with much additional material and further analysis.

In May 1968, the senior author was in Greece to update Shaw's series, which ended with 1963. For the basic production series, revised data for 1963 and new data, including preliminary estimates through 1967, were secured. For many items, such as inputs and prices, 1966 data were the latest available. These have been used to extend Shaw's measures of growth and other series. We are particularly grateful to Georgios Gregoriou, Director of Agricultural Economics and Planning in the Ministry of Agriculture, and his deputy John Baltazzis. The Center of Planning and Economic Research supplied data and was otherwise helpful as a base of operations. Other sources were the National Statistical Service, the Agricultural Bank, and the Bank of Greece. Anthony Trimis of the American School, Thessaloniki, arranged contacts in that area. Anthony Admopolous, Director of the Regional Development Service of Northern Greece, was a valuable source of general information about that region.

We also appreciate the general guidance and suggestions of Raymond P. Christensen, Director, Foreign Development and Trade Division (FDTD), under whose direction this work was carried out; L. Jay Atkinson, Chief, Economic Development Branch, FDTD; and others.



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## SUMMARY

From 1947-67, agricultural output in Greece increased at the compound annual rate of 4.9 percent. This was an important factor in the strong growth rate of the total economy; gross domestic product (GDP) increased at the rate of 5.2 percent over the same period. Population grew very slowly, at 0.8 percent a year, and agricultural production per capita increased 4.2 percent a year.

Crop output increased 4.4 percent a year, and livestock, 6.6 percent. A small group of livestock feed crops and the important industrial crops of tobacco and cotton led in rates of growth. Output of grains, dominated by wheat and including feed grains, had about average growth, while that of trees and vines increased slowly. Output of cattle dominated growth in livestock products, while sheep and goat output grew more slowly. In 1967, per capita production of meat was 58 pounds; milk, 290 pounds; pulses 22 pounds dry weight; and eggs, 200 -- the basis for a relatively well-balanced diet.

This growth was accomplished in a country about the size of the State of Arkansas. About 30 percent of the land was used for crops, 40 percent used for pastures, and 30 percent for forests, cities and infrastructure, and waste. The quality of Greek agricultural resources is extremely varied, from fertile irrigated plains through rolling foothills to rough and isolated mountainous areas. Similarly, the climate varies, from the relatively dry and mediterranean weather of the south to the continental weather of the north. Modern Greece is a relatively new nation that had only the brief period between two world wars to consolidate its territory and lay a foundation for the development that has taken place since World War II. Its farms are universally small and badly fragmented, but they are almost entirely owner operated. They were strongly subsistence-oriented, but commercialization has been rapid.

Greece has limited opportunity to expand the area of cropland. This area increased 0.8 percent per year from 1947 to 1967, the same rate as population. Most of the increased output came from land development and improved technology. Irrigated area increased at the rate of 5.8 percent per year from 1950 to 1967, when it approached 17 percent of total cropland. Improved varieties, rapidly increasing supplies of fertilizer, and credit were important factors in increasing productivity of land. Labor was in oversupply. About 50 percent of the population was rural in 1967; it had declined slightly after 1947. One of the major development goals was reduction of the rural population, but the rest of the economy was not able to provide adequate employment opportunities for these people.

Development of the agricultural sector was encouraged and directed by a favorable economic environment, which included price supports, bonuses, and subsidies. These, with strong credit support through the Agricultural Bank, and with direct investment by the Government in land development and other fixed assets in agriculture, enabled large income transfers to be made from the general economy to the agricultural sector. On the other hand, output of this sector supplied food to meet the growing demand arising mostly from increasing incomes, enabled important import substitutions to be made, and provided export commodities that increased about as rapidly as agricultural imports.

External assistance was an important factor in the reestablishment and growth of the economy. From 1949 to 1950, it totaled about 10 percent of GDP; from 1953 to 1957, it averaged about 3 percent; and until 1966, it continued at about 1 percent. Not only was the relative scale of assistance larger than the amount most developing countries have had, but Greece was able to make good use of this aid. Public Law 480 commodities were very effective. Wheat helped balance national needs while domestic production was being built up, and was managed so as not to interfere with the building-up process. Feed grains were widely distributed at favorable prices and their use started improved feeding practices that farmers have continued.

Greece has a 5-year development plan for 1968-72 that features ambitious goals and is realistic in its proposed means of obtaining them. The plan does not hesitate to propose major adjustments in institutions and economic relationships that are means to desired ends. Major participation of the Government in economic activities used in development is to be withdrawn as rapidly as possible.

There is much to be learned from the Greek experience for other developing countries. Greece followed a logical sequence in developing the technology of crop production, but neglected livestock. The high income elasticity of demand for animal-derived foods was not anticipated, and because incomes were rising, these foods were responsible for most of the increase in agricultural imports. While literacy is high, and secondary and advanced education is adequate in scale, there are generally not enough persons with technical and agricultural education. But in the main, Greece made the proper decisions and took vigorous action to reach a stage of self-sustaining growth.

## INTRODUCTION

Total agricultural output of Greece increased at a compound annual rate of 4.9 percent a year from 1947-49 to 1965-67. Agricultural production per capita increased 4.2 percent. The broad purpose of this study was to examine the factors leading to rapid growth of the agricultural sector of the Greek economy and to see how the Greek experience can contribute to policies, programs, and program implementation in other developing countries. This experience will be most relevant to small countries with (1) slow population growth, (2) little opportunity to expand the area of agricultural land, and (3) only moderate opportunity for industrial growth.

Factors other than the outstanding rate of development contributed to the interest in Greece. It was the first of the "Marshall Plan" countries. Beginning with post-World War II relief and reconstruction support in 1945, U.S. economic aid in commodity, monetary, and technical assistance grants and loans reached about \$1.8 billion before self-sustaining growth was attained in Greece and the AID program was terminated in 1965.

Also, Greece continues to be an important market for U.S. industrial and agricultural products, and the United States buys certain products from Greece. Other factors maintaining cultural and economic ties between the two countries include Greek migration to the United States and U.S. tourism to Greece.

The selection of Greece broadened the range of characteristics represented by the countries selected for the intensive study -- Phase 2 -- and Greece is the only European country included. In northern Greece, we examined the problems of a temperate climate dominated by continental influences, whereas in southern Greece and the Islands, where there is a Mediterranean climate, we examined characteristics and problems similar to those of the Near East.

### Scope of Report

Chapter I describes expansion of agricultural output and the two major components -- crops and livestock. This is followed by a description of growth characteristics of major subgroups of crops and livestock and of regions. Also included is a cross-sectional description of land use, area and production of crops, and inventories and production of the major livestock classes in 1967. Background on the historical, physical, and organizational basis of the agricultural sector and total economy is given in chapter II.

Next, a series of chapters report and analyze growth factors. Chapter III relates the agricultural sector to the national economy, with emphasis on their interdependence. Chapter IV is concerned with changes in quantities and productivity of the factors of production -- land, labor, and capital. Chapter V deals with sources and dissemination of new technology, chapter VI with the economic environment within which farmers made their decisions, and chapter VII with development of land resources. Chapter VIII reviews the external assistance that supported the development of the Greek economy for 20 years after World War II. Chapter IX reviews the development plan of Greece for the 5 years 1968-72.

Lastly, chapter X discusses the general relevance of the Greek experience to planning and implementing development in other countries.

## The Data

All tables and figures reporting time series of crop areas, tree or livestock numbers, production, yields, prices, and related growth rates and indexes are Ministry of Agriculture data or are derived from them, unless specifically noted otherwise. The National Statistical Service of Greece publishes the official data covering all aspects of the economy. However, when this study was initiated, the Ministry of Agriculture was the only source that covered the timespan of the study and provided adequate regional and commodity detail. In the past, some material differences existed between Ministry and Statistical Service series, but in recent years, these differences have become insignificant.

A variety of other important sources provided material on inputs and other factors, including the Statistical Service, the Agricultural Bank, the Center for Economic Research and Planning, the National Accounts, Food and Agriculture Organization, the United Nations, and many others. Nonstatistical information on policies, programs, significant crises and events, and the like, came from even more divergent sources, ranging from the Organization for Economic Cooperation and Development reports on policy to personal interviews. Such sources are identified to the fullest extent possible or reasonable.

## Time Period

The basic timespan for analysis was 1947-67. This was divided into four periods for convenience in analysis, with 3-year averages of 1947-49, 1952-54, 1957-59, 1961-63, and 1965-67 as endpoints for calculating growth rates during the entire study period and the subperiods (table 1). Time periods delineated by these endpoints have only general significance. Using averages of three beginning and ending years as endpoints reduces the influence of extreme annual variations. In a few series that characteristically do not have these distorting variations, the end year itself was used.

The first endpoint, 1947-49, includes the period of internal struggle that followed World War II, when productive resources were at a low ebb. The second point, 1952-54, roughly marks the end of the time during which agricultural resources, destroyed and dissipated during the war and the Greek insurrection, were reassembled -- a period of reconstruction. The period ending with the third point -- 1957-59 -- was one of rapid growth and significant expansion of cropland. The period ending with the fourth point -- 1961-63 -- showed relative stability. Strong growth resumed in the final period studied, ending with 1965-67.

Vertical grids in the figures are placed at the midyear of the endpoints. Data series that begin in 1948 and end in 1966, such as those from the National Accounts, are bounded by these midyears. Some series begin as early as 1945, and these data are included in figures and tables.

Regional series did not begin for crops until 1952, and not until 1954 for livestock, which limited long-term regional analysis.

## Terms

Metric or local units are used predominantly in this report. The drachma has been stable at 30 to the dollar since 1954, when the cumulative inflated value was divided by 1,000 and the value stabilized -- 1 drachma equals 3-1/3 cents. Another pervasive local unit is the "stremma," applied to land area. Its use is rational in a country of highly fragmented small farms. One stremma equals one-tenth of a hectare or one-fourth of an acre. The metric ton, in general use internationally, is used in



Table 1.--Time periods used in the study

| Period        | Dates     |         | Length of period <u>1/</u> |              |
|---------------|-----------|---------|----------------------------|--------------|
|               | Beginning | End     | Spanned                    | Observed     |
|               |           |         |                            |              |
|               |           |         | <u>Years</u>               | <u>Years</u> |
| First .....   | 1947-49   | 1952-54 | 5                          | 8            |
| Second .....  | 1952-54   | 1957-59 | 5                          | 8            |
| Third .....   | 1957-59   | 1961-63 | 4                          | 7            |
| Fourth .....  | 1961-63   | 1965-67 | 4                          | 7            |
| 1947-67 ..... | 1947-49   | 1965-67 | 18                         | 21           |

1/ Years "spanned" is the number of years between midyears of endpoint averages; "observed" includes the extreme years of both the beginning and ending endpoint averages. The years 1947 and 1967 count only as their weight in endpoint averages.

this report. However, inches of precipitation, degrees Fahrenheit, miles, and U.S. dollar values are used where they seem more appropriate.

#### Commodity Groupings

Agricultural output as reported here is aggregated from 92 commodities, estimated to cover over 99 percent of the total value of products. Most of these are identified individually and their 1967 physical output reported in the latter part of chapter I. Major aggregates, expressed either as indexes or value of output in constant value terms, are derived from the annual output of each commodity times its 1957-59 national average price received by farmers, which yields annual value series with quantity as the variable. Thus, output of unlike individual items can be aggregated in a meaningful way into desired groupings.

#### Measuring Growth

Among the several concepts that might be used to measure growth, compound annual growth rate is the most compatible with objectives of the study. It may be calculated in several ways:

1.--The logarithmic regression relates mathematically to all observations during the time period and provides the rate directly, but has problems arising from the pattern of deviation about the regression line.

2.--The arithmetic regression yields the rate at the mean, but abstracts from the relationship between the ends of the series.

3.--The endpoint method, which was used in the study, simply describes the compound growth rate over the time period from the initial value to the end value,

and relates in no way to the behavior of the series between endpoints. It is subject to distortion by aberrations of the endpoints from any basic trends that might exist.

Using the endpoint method, the formula is:  $r = \sqrt[n]{\frac{p_1}{p_0}} - 1$  where  $r$  is the

compound annual growth rate;  $p_0$  and  $p_1$  are the values of the beginning points and endpoints, respectively; and  $n$  is the number of years.

As noted earlier, agricultural output increased at a compound annual rate of 4.9 percent from 1947-49 to 1965-67; crop output grew at 4.4 percent and livestock at 6.6 percent. Feeds and industrial crops led in crop growth rates; grains, which constitute the largest crop group, were about average; and output of vines rose very slowly. Output of cattle grew fastest among the livestock classes, followed by poultry, with sheep -- the major class in terms of output -- growing slowest at 4.4 percent. Growth of crop output was highest in Northern Greece, while growth of livestock output was more dispersed throughout the country. Compared with the diet of most other developing countries, the Greek diet was well-balanced because of the high per capita output of animal-derived foods and pulses in 1967.

### Aggregate Growth

By 1945, total agricultural output in Greece was at a very low level as a result of the occupation of Greece during World War II and the struggle for liberation (fig. 1). Total output was 59 percent of the prewar level but had recovered by 1950. Crop output had recovered by 1947, while livestock output did not recover until 1954. Lowered crop output in 1948 and livestock output in 1949 reflect effects of the period of internal disturbances. This period ended in September 1949, and by June 1950, practically all refugees had returned to their villages. Sustained development and growth followed.

In 1947-49, crops accounted for 77.7 percent of total agricultural output, and in 1965-67, for 70.8 percent. The annual variations in crop output were the most dominant in total output. Livestock output changed much more smoothly over time.

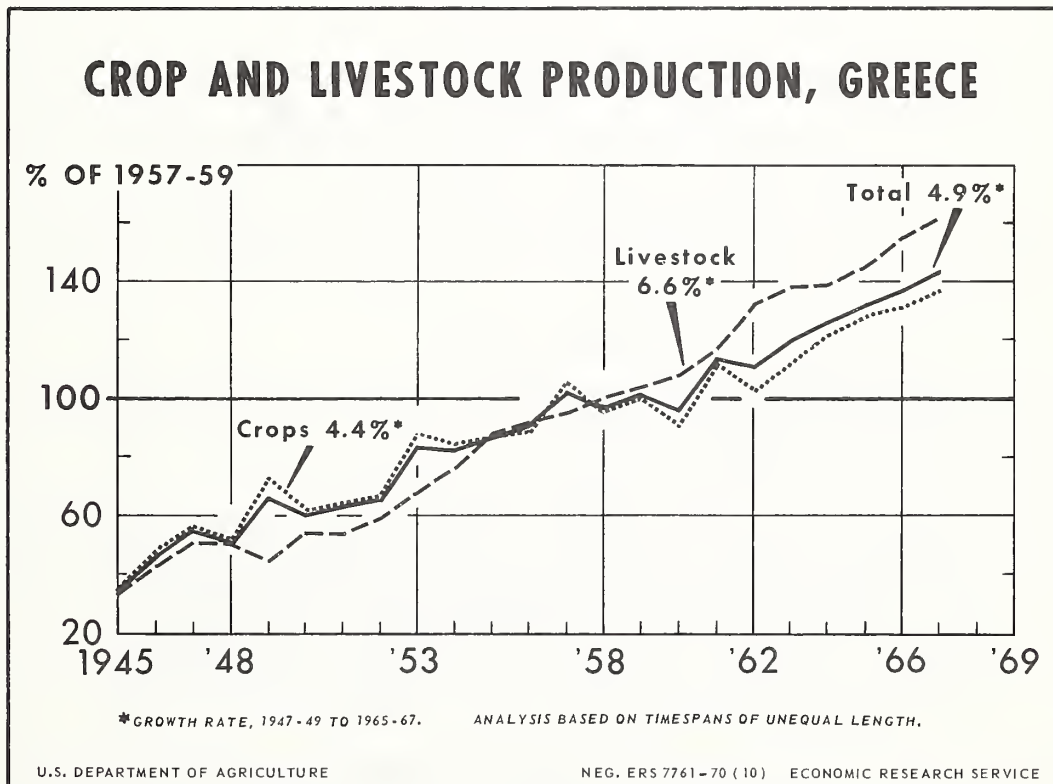


Figure 1

Growth rates in subperiods demonstrate significant changes over time (table 2). Two outstanding features are the very low rate of growth of crop output in the third period, and its strong recovery in the fourth -- both features reflected in total output. All rates were considerably lower in the last period (1961-63 to 1965-67) than in the first (1947-49 to 1952-54). Growth rates for livestock declined steadily, although absolute increases were apparently fairly constant from period to period. The table also shows that a large part of the growth in total output is reflected in per capita growth.

Table 2.--Compound annual growth rates in output of crops, livestock, and total agriculture, selected periods

| Period                             | Crops | Livestock | Total<br>agricultural<br>output |
|------------------------------------|-------|-----------|---------------------------------|
|                                    |       | Percent   |                                 |
| First (1947-49 to 1952-54) .....   | 5.7   | 9.9       | 6.0                             |
| Second (1952-54 to 1957-59) .....  | 4.6   | 8.1       | 5.4                             |
| Third (1957-59 to 1961-63) .....   | 2.1   | 6.6       | 3.3                             |
| Fourth (1961-63 to 1965-67) .....  | 4.9   | 4.5       | 4.7                             |
| Study period (1947-49 to 1965-67): |       |           |                                 |
| Gross .....                        | 4.4   | 6.6       | 4.9                             |
| Per capita <sup>1/</sup> .....     | 3.6   | 5.7       | 4.2                             |

<sup>1/</sup> The compound annual growth rate of the population from 1949 to 1967 was 0.8 percent.

Source: Based on data from (23) and (52). Underscored numbers in parentheses refer to items in References at the end of this report.

#### Commodity Growth

Of the major crop groups, output of feed crops (hay, forages, and pulses for feed) grew fastest from 1947-49 to 1965-67, but still was not of great importance (fig. 2). Most of the growth in industrial crops occurred during the first two periods.

Grains are conspicuous in their total value and substantial growth, although they actually declined in the third period, and had the lowest output at that time. Wheat led in growth in the second and fourth periods, although other grains, mainly barley, rice, and maize, also showed strong growth, especially in the fourth period. Barley had the highest growth rate of all principal commodities.

Tree crops have three major components -- olives, which were relatively stable; citrus fruit; and deciduous fruits. Vine output did not grow much.

Output of products from cattle grew fastest in value among the five major livestock groups from 1947-49 to 1965-67 (fig. 3). Output includes beef, milk, and hides, with milk production growing fastest. Cattle started from a small base, little more than one-third that of sheep, but at the end of the period almost equaled them in output.

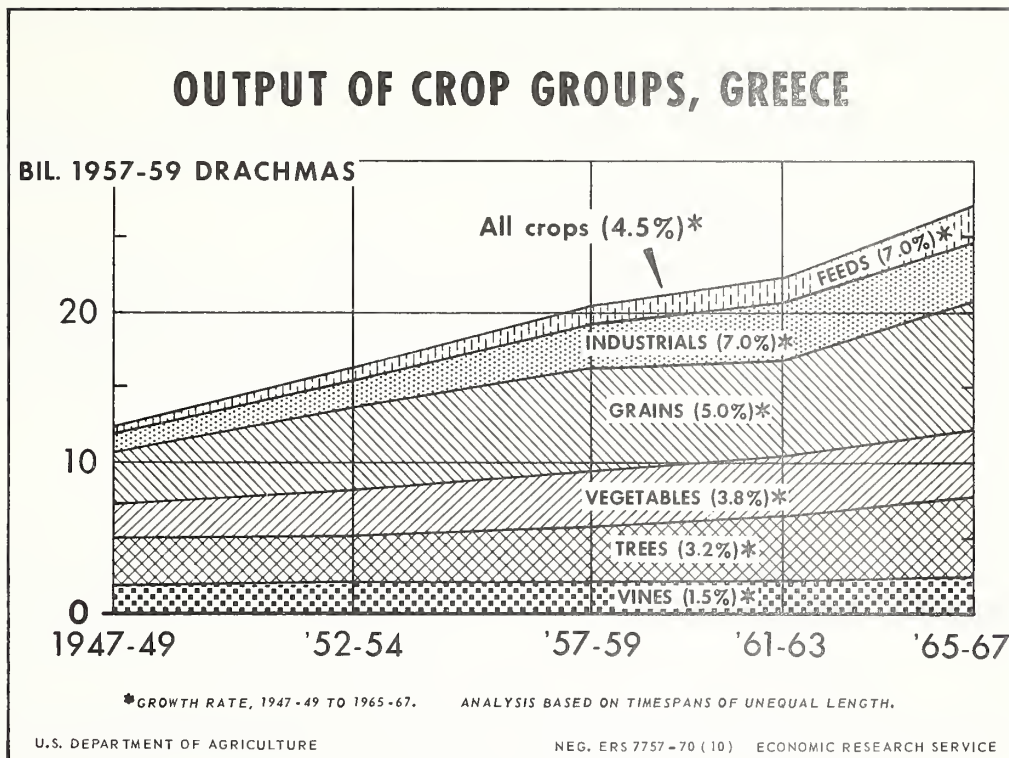


Figure 2

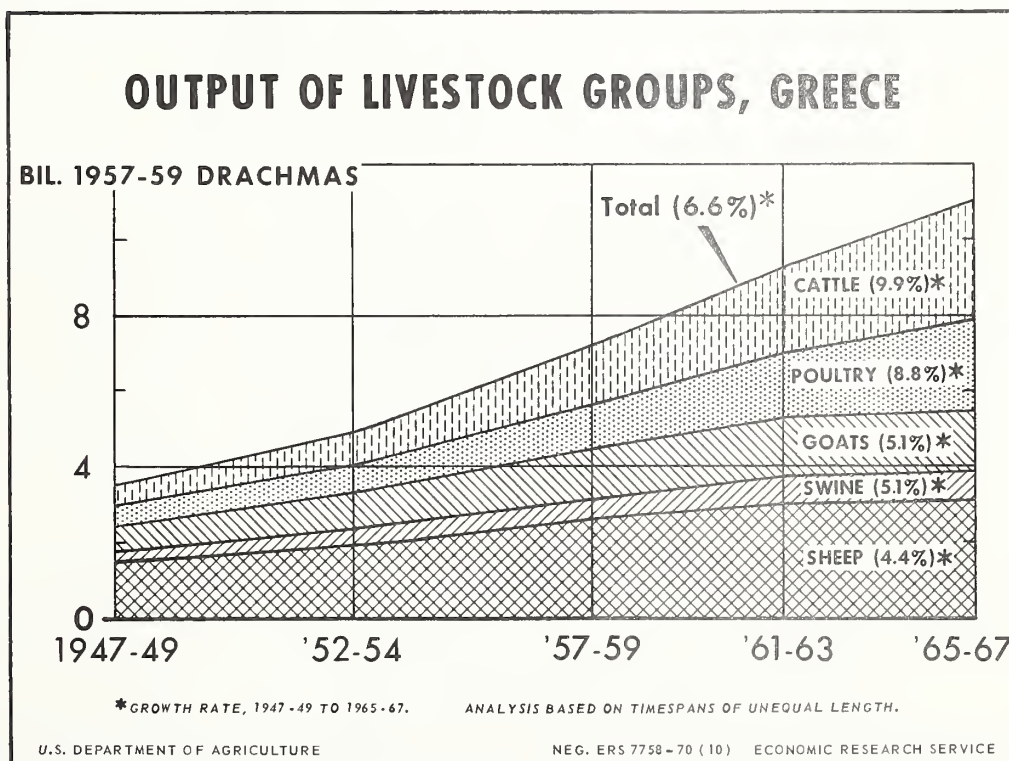


Figure 3



Poultry production was the other fast-growing enterprise, with egg production accounting for most of the growth. Growth in poultry production tended to be concentrated near the population centers of Thessaloniki and Greater Athens.

Growth rates of output from goats, sheep, and pork were similar and at markedly lower levels than those of cattle and poultry. Growth in output of products (primarily milk) from goats and sheep slowed markedly in the fourth period, while most growth in pork output occurred after 1957-59.

Table 3 shows the 1947-49 and 1965-67 physical output of a few major commodities, arrayed in descending order of their rates of growth in output. These were selected from among the 92 individual commodities that were combined into the several commodity groups (figs. 2 and 3). The table illustrates the strong growth in output of commodities such as cotton, beef, and eggs; the intermediate growth rates of sheep's milk, pork, wheat, and tobacco; and the relative stability of olives and grapes.

### Regional Growth

In figure 4, the regions are arranged in descending order of growth rate of crop output from 1952-54 to 1965-67 (regional data for crops were first reported for 1952). While not large in total, the growth rate in Thessaly reflects the high proportion of cropland that was developed during the period. Macedonia's importance is shown both by its total output and the fact that it had one of the higher growth rates. The top three regions -- Thessaly, Thrace, and Macedonia -- make up northern Greece. This well-watered area has a temperate climate and substantial plains and semimountainous areas. It contained 46.5 percent of cropland harvested in 1965-67 and contributed 50.0 percent of the value of crops and 44.3 percent of livestock. High-value crops are concentrated in these regions, especially in Macedonia. In each of these regions, wheat was still the most important contributor to growth during the fourth period. Thessaly not only showed the highest growth rate, but its growth was broadly based (as in Macedonia and Central Greece). Thessaly's production of grains other than wheat increased considerably faster than wheat output, 6.2 versus 4.3 percent per year. This shift also occurred in Central Greece -- 2.6 versus 1.5 percent. Macedonia had a slight shift -- 5.3 versus 4.7 percent.

At the other extreme are the islands (Ionian and Aegean). They are small in total cropland area, and generally rough and dry. Olives, their predominant crop, have shown relatively slow growth. Island drainage systems do not aggregate much water for irrigation development, and other opportunities for agricultural growth are limited. Crete is large, with high mountains providing water for irrigation; hence, it has potential for a moderate rate of growth. The island has reduced its wheat production and increased its olive output significantly. During 1954-56 to 1965-67, Crete was consistently high in the percentage that its crop output was of total agriculture, followed by the Ionian Islands, the Peloponnesus, and Macedonia (table 4). Emphasis on crops was less in Central Greece and Epirus, but only on the Cyclades Islands did crops become less important than livestock.

Figure 5 shows regional growth from 1954-56 to 1965-67 in livestock output (regional data for livestock were first reported for 1954). Central Greece ranked high in growth of livestock output and was the only major region to show a significant shift toward livestock production. The Aegean Islands made a similar shift, and Thrace, a moderate one. Important components in growth of livestock output in Central Greece were milk, eggs, poultry, and pork, products primarily oriented to the Athens market. Macedonia was third highest in growth in livestock output, as it was in crops, while Thessaly and Epirus were lowest. These last two regions contain concentrations of sheep for milk production, and output from sheep experienced the slowest growth of the major livestock enterprises in these regions.

Table 3.--Production and growth rates of selected commodities, 1947-49 and 1965-67

| Commodity          | Average annual production |           | Growth rate |
|--------------------|---------------------------|-----------|-------------|
|                    | 1947-49                   | 1965-67   |             |
|                    | ----- Metric tons -----   |           | Percent     |
| Beef meat .....    | 10,798                    | 67,077    | 10.9        |
| Cotton .....       | 39,319                    | 237,306   | 10.5        |
| Eggs .....         | 18,764                    | 88,673    | 9.0         |
| Sheep's milk ..... | 140,943                   | 397,184   | 5.9         |
| Wheat .....        | 738,832                   | 1,931,959 | 5.5         |
| Pork .....         | 17,294                    | 41,963    | 5.1         |
| Tobacco .....      | 43,286                    | 105,341   | 5.1         |
| Olive oil .....    | <u>1</u> /103,333         | 190,333   | 3.5         |
| Table grapes ..... | <u>1</u> /117,333         | 152,000   | 1.6         |
| Grape must .....   | <u>1</u> /419,333         | 427,666   | 0.1         |
| Table olives ..... | <u>1</u> / 41,666         | 47,000    | 0.6         |

1/ 1948-49 average.

Source: Based on data from (23) and (52).

Table 4.--Crop production as a proportion of gross agricultural output of regions, selected periods

| Region               | Period              |         |         |         |
|----------------------|---------------------|---------|---------|---------|
|                      | 1954-56             | 1957-59 | 1961-63 | 1965-67 |
|                      | ----- Percent ----- |         |         |         |
| Peloponnesus .....   | 78                  | 78      | 73      | 74      |
| Central Greece ..... | 70                  | 68      | 64      | 61      |
| Thessaly .....       | 67                  | 71      | 68      | 71      |
| Epirus .....         | 57                  | 60      | 55      | 59      |
| Macedonia .....      | 77                  | 77      | 75      | 75      |
| Thrace .....         | 73                  | 72      | 67      | 68      |
| Aegean Islands ..... | 80                  | 76      | 74      | 70      |
| Cyclades .....       | 62                  | 57      | 54      | 48      |
| Crete .....          | 80                  | 81      | 78      | 79      |
| Ionian Islands ..... | 74                  | 76      | 71      | 76      |
| Dodecanesos .....    | 74                  | 73      | 68      | 65      |
| Total Greece .....   | 74                  | 74      | 71      | 71      |

Source: Data from (23) and (52).

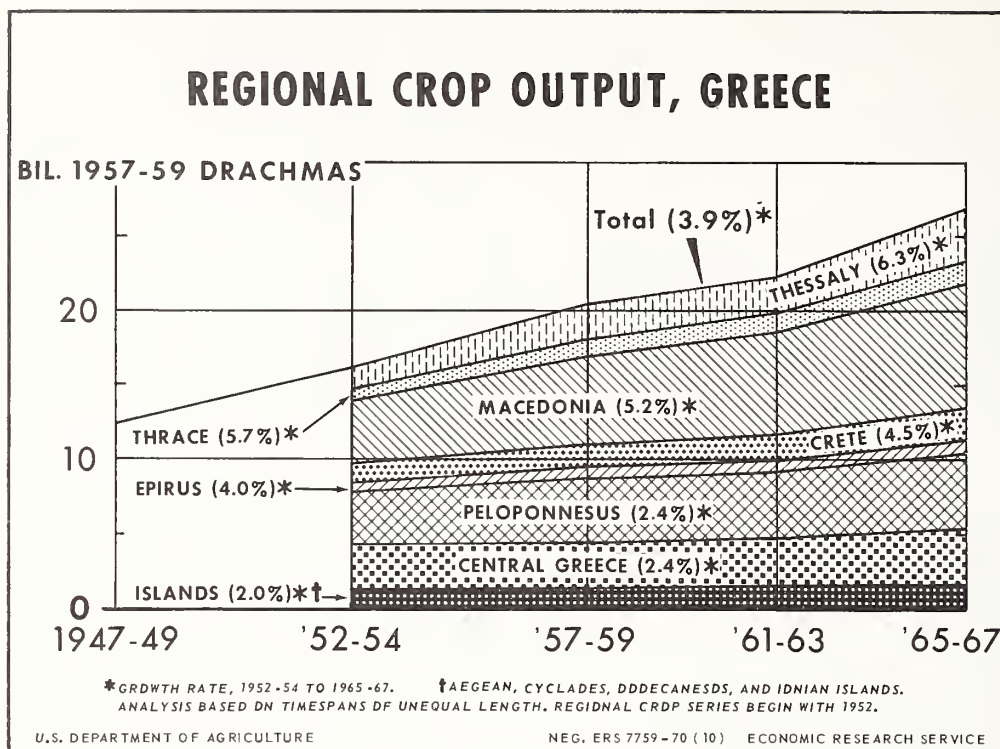


Figure 4

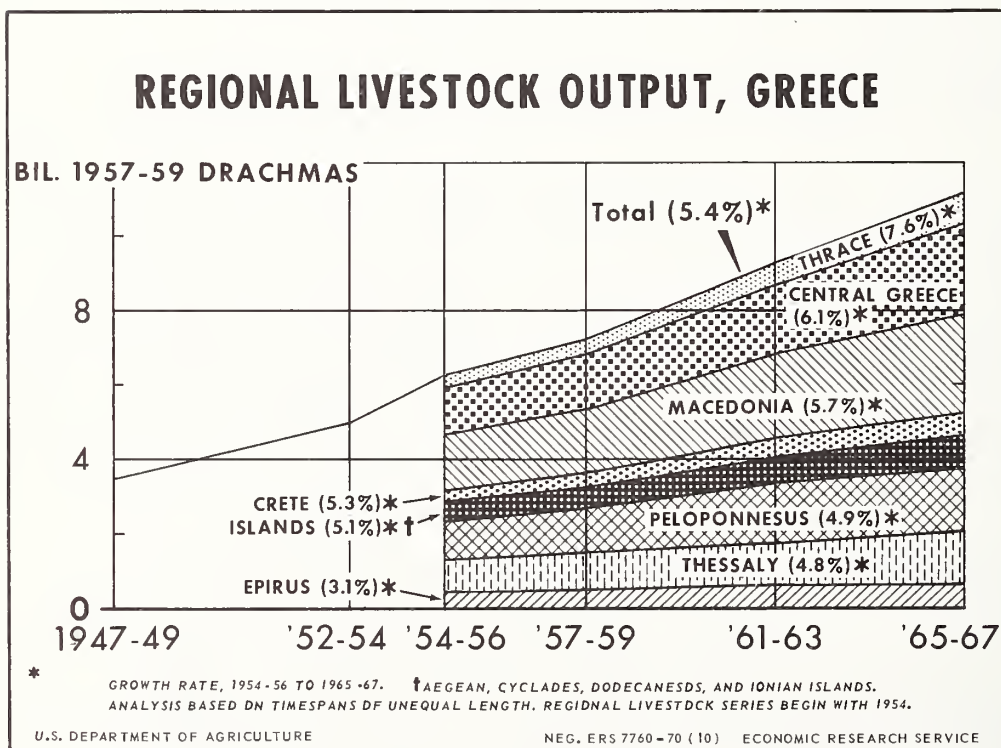


Figure 5

## Land Use

About 30 percent of the land area of Greece is used for crops of various kinds, and little potential remains for further expansion. Another 40 percent is estimated to be used for pastures of various qualities and types. The remaining 30 percent is in forest, waste, and other use. "Cropland," as used in this report, is the equivalent of "agricultural land," "arable land and land under permanent crops," and other similar terminology used in various reports.

### Cropland

The area of cropland (or agricultural land) is difficult to measure and to relate to the total area of individual crops and fallow. The major complications arise from the practices of interplanting crops, such as maize and beans, which are grown together at the same time; planting seasonal crops in orchards or vineyards; and successively planting different crops, such as barley and maize or any small grain and vegetables, on the same land during the year. The problem is illustrated below:

| Use of land   | Area, 1967    |
|---|---------------|
|   | 1,000 stremma |
| Field crops .....   | 26,631.0      |
| Vegetables and other garden crops .....                                 | 1,172.2       |
| Vines (grapes and raisins) .....  | 2,315.4       |
| Area under trees (in compact plantations) .....                         | 6,191.0       |
| Total area of crops .....   | 36,309.6      |
| Fallow land .....   | 4,622.0       |
| Total area of crops and fallow .....                                    | 40,931.6      |
| Net mixed plantings reported .....                                      | -331.6        |
| Residual area of crops and fallow .....                                 | 40,600.0      |
| Area of cropland .....  | 39,364.0      |
| Implied area of other mixed plantings and successive<br>plantings ..... | 1,236.0       |

Source: Compiled and calculated from (57).

Some 929,000 stremmas of vegetable gardens and fields under vegetables were reported, although apparently not considered part of cropland. This area includes vegetables essentially for home use, while commercial vegetables and nurseries are included in the total area of crops.

The report, Agricultural Statistics of Greece, includes an item for 1962, not repeated since, of almost 1.2 million stremmas of mixed cropping in compact plantations of trees. This amount is in addition to an area in 1962 of 1.9 million stremmas of implied successive and mixed plantings arrived at as was done in the tabulation above. Thus, there was possibly double counting of perhaps over 1 million stremmas in total cropland for 1967, a problem that cannot be resolved with data at hand. Successive plantings are important where field crops such as barley and maize or grains and vegetables are grown in the major irrigated area. In addition, in 1967 there were nearly 7 million stremmas of compact plantations of trees and vines in areas in which the practice of interplanting in the rainy winter season is common.



## Pastures

The amount of pasture -- land primarily used for grazing by livestock -- is only an approximation at best. Most of this area is considered natural pasture. It generally has a sparse cover of grasses and forbs that include annual and perennial legumes. Shrubs and trees are common and contribute to grazing, especially at lower elevations. As a result of continual overgrazing, much of the area is partially denuded and eroded, and has relatively low carrying capacity. Of the principal cover types, the maquis-and-shrub type is the most important in area and distribution. High-mountain pastures have principally grasses and grade upward into an alpine zone. The medium-mountain group is dominated by woodland and brush.

Pasture area is supplemented by fallow land and crop residues; grass and other pastures in orchards, vineyards, and olive groves; and a small area of meadow established on cropland.

## Forest and Other Land

The major part of forest and other land is classified as forest, most of it at high elevations and of varying quality and accessibility. Also included are rocky, stony, and otherwise unproductive areas, mostly in the mountains, and beaches along some 9,300 miles of shoreline. Cities, towns, villages, and roads and highways also occupy substantial areas.

## Area and Production of Crops

Greece produces most of the important agricultural commodities, except those limited to the humid tropics. Neither sugarcane nor hard fibers are important crops. Wheat, olive oil, and wine are the three major, traditional dietary staples. The crops on cropland are reported in four groups -- field crops, commercial vegetables, vines, and trees in compact plantations.

## Field Crops

Field crops, termed "crops on arable land" in the source report, occupied about 73.2 percent of the area of all crops, including area in multiple use, reported for 1967 (57). <sup>1/</sup>

Grains.--These crops occupied 63 percent of the field-crop area in 1967 (table 5). Wheat alone was 40 percent. Although it is grown throughout the country, areas of concentration are Thessaly, Macedonia, and Thrace, where it accounted for over 40 percent of the total area of crops. Nationally, the average yield is depressed by low yields in the many unfavorable sites where wheat is grown.

Rice is the other important food grain. Main producing areas are irrigated lowlands in Macedonia and Central Greece. Production could be expanded to similar areas; however, Greece was approaching self-sufficiency in 1967, with output at approximately 93,400 tons.

Area of feed grains, mostly barley, corn, and oats, totaled 5.6 million stremmas in 1967, over 21 percent of the field crops. Some 3.5 million stremmas were barley,

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<sup>1/</sup> Underscored numbers in parentheses refer to items in References, at the end of this report.



Table 5.--Field crops, area and production, 1967

| Field crop                     | Area              | Production |
|--------------------------------|-------------------|------------|
|                                | 1,000 stremmas    | 1,000 tons |
| Cereals:                       |                   |            |
| Wheat .....                    | 10,510.5          | 1,936.0    |
| Rice .....                     | 178.6             | 93.4       |
| Barley .....                   | 3,512.4           | 773.7      |
| Oats .....                     | 1,112.7           | 153.4      |
| Maize .....                    | <u>1</u> /1,334.5 | 312.9      |
| Other <u>2</u> / .....         | 194.0             | 21.1       |
| Total .....                    | 16,842.7          | 3,290.5    |
| Edible pulses:                 |                   |            |
| Beans .....                    | 610.4             | 56.8       |
| Broad beans .....              | 136.5             | 13.2       |
| Lentils .....                  | 114.4             | 9.0        |
| Chickpeas .....                | 159.2             | 14.4       |
| Other .....                    | 34.7              | 2.7        |
| Total .....                    | <u>3</u> /1,055.3 | 96.1       |
| Feeds:                         |                   |            |
| Fodder seeds <u>4</u> / .....  | 619.3             | ---        |
| Hay .....                      | 3,666.6           | ---        |
| Green feed and roots .....     | 62.0              | ---        |
| Grasses for grazing .....      | 585.5             | ---        |
| Total .....                    | 4,633.4           | ---        |
| Industrial crops:              |                   |            |
| Tobacco .....                  | 1,289.4           | 114.1      |
| Cotton .....                   | 1,364.7           | 285.4      |
| Sesame .....                   | 168.9             | 6.5        |
| Sugar beets .....              | 167.6             | 862.1      |
| Other .....                    | 172.9             | ---        |
| Total .....                    | 3,154.5           | ---        |
| Melons, watermelons, potatoes: |                   |            |
| Watermelons .....              | 285.3             | 490.1      |
| Melons .....                   | 93.9              | 102.0      |
| Potatoes .....                 | 563.8             | 598.8      |
| Sweetpotatoes .....            | 2.2               | 2.2        |
| Total .....                    | 945.2             | ---        |
| Total field crops .....        | 26,631.0          | ---        |

1/ Includes approximately 314,700 stremmas interplanted with beans and other crops.

2/ Rye, millet, sorghum, and others.

3/ Includes approximately 289,600 stremmas of beans interplanted with other crops.

4/ Vetch accounts for more than half; production not reported.

Source: Compiled from (57).

part of which is an industrial crop. Like wheat, it is grown throughout Greece, but barley is a more productive crop in drier areas -- hence, it is more important than wheat in the Aegean Islands -- and it also can be grown at higher elevations, in mountainous areas. Corn is also widely grown, but production is concentrated in the more humid areas extending north from the western part of Central Greece through Epirus, Macedonia, and Thrace. Oats, too, are widely distributed, but are most productive in cool, moist areas.

Legumes.--These edible pulses are grown on about 4 percent of the field-crop area. Over one-fourth of this area is in kidney beans interplanted with corn or other crops. As a group, pulses are grown throughout Greece, with concentrations in mountainous areas, including Crete, and in eastern Macedonia and Thrace.

Fodder crops.--Included are grain and other hay, legumes harvested for grain, green feeds and roots, and crops for grazing. As a group, they accounted for some 18.4 percent of the area of field crops. Of this proportion, about 70 percent was used for hay, 16 percent for leguminous seeds, and 2 percent for green feed, and 12 percent was grazed. Geographical distribution is inverse to the proportion of land in crops, implying, as would be expected, that fodder crops are associated with livestock enterprises, where the proportion of area in pasture is high.

Industrial crops.--A relatively large change in their form, and consequently in value, is required between production and final consumption. Their utilization requires the development of processing industries that must be coexistent and coordinated with farm production for the crops to become commercially valuable.

Tobacco is a major export earner, accounting for almost 40 percent of all agricultural exports in 1966 and produced from 4.8 percent of the area of field crops. It is a high-value crop per unit of land, and requires a high labor input. Tobacco production got its major impetus after 1922, when refugees from Asia Minor brought new skills and varieties of Asian types and introduced tobacco production in new areas. The type and amount that can be grown is subject to Government control, and each locality concentrates on one or two types. Some Virginia types are being produced in irrigated areas of Macedonia, but nonirrigated Asiatic types predominate. A warm and moderately moist growing season is required, and soil requirements are specific and differ by variety. Major production is highly concentrated; about 98 percent of the crop comes from Central Greece, Macedonia, and Thrace.

Cotton is the other major industrial crop of Greece, and in 1966 constituted nearly 13 percent of total agricultural exports. Its moisture requirements are such that production is increasingly concentrated on irrigated land, especially in Macedonia, Thessaly, and Central Greece. Greece is the only European country exporting cotton to neighboring countries.

Sugar beets are a relatively new crop, with production concentrated near processing plants in irrigated areas of Thessaly and Macedonia. Other less important industrial crops include sesame, sunflowers, peanuts, broom sorghum, pumpkins, flax, and aniseed.

Melons, watermelons, and potatoes.--A separate group of field crops, these are used fresh; hence, yields reflect high water content (sugar beets are the only other field crop reported that have this characteristic). Total acreage of these crops is not large. Since wheat is the major source of starch in the Greek diet, potatoes are relatively unimportant.

## Commercial Vegetables

The area, including that of nursery crops, accounts for about 4.3 percent of the area of crops of all kinds (table 6). These crops are intensive in labor inputs and generally of high value in relation to land area used. Their value is emphasized even further by their essential place in balanced diets. Commercial vegetables are supplemented by the almost equal area of gardens mentioned earlier. In total, the Greek diet contains a large proportion of vegetables, and they are grown throughout the country. However, there are concentrations near large cities, and also geographic variations according to climatic adaptability of individual kinds.

## Vines

Grapes and raisins use about 6.4 percent of the crop area. Special types of grapes and currants are grown specially for wine, table use, or drying, but each type is used to some extent for the other purposes (table 7). By far the most important in area and production is wine grapes. Over 383,000 tons of wine were produced in 1967, almost entirely for domestic consumption. Production is concentrated in Central Greece, the Peloponnesus, Crete, and the Aegean and Ionian Islands. Table grapes have in the past been for domestic consumption, but production for export is developing rapidly in the north.

Currants and sultanas are traditional export crops, exceeded only by tobacco in value. Production of currants is concentrated in the Peloponnesus (the name, currant, is reportedly derived from Corinth), and a small amount comes from the Ionian Islands. Sultanas are grown primarily on Crete, with lesser amounts on the Peloponnesus and Aegean Islands.

Scattered throughout Greece, but with more than half in Central Greece, are almost 2.3 million "climbing and other vines." These are not in compact plantations -- rather they seem to be vines in villages and towns, on walls, and in other out-of-the-way places, primarily for home use. That these included many grapes is attested by the fact that they were credited in 1967 with producing approximately 4,500 tons of grapes for wine, and approximately 18,800 tons for table use, plus 88 tons of raisins. They probably included many other kinds of fruit and berries, such as capers, raspberries and blackberries, and certain spices.

## Tree Crops

Trees in compact plantations made up 16.1 percent of the total area of crops in 1967 (table 8). However, only about 71 percent of the trees were in compact plantations. Scattered trees, though perhaps not as well cared for and hence not as high-yielding, contributed materially to total output of various fruits, nuts, and other products. Proportions of the several classes and many individual kinds of trees in compact plantations varied widely.

Citrus assumed major significance in Greece only in recent years, developing rapidly as an export crop. Production increased from an estimated 55,000 tons in 1938 to 454,000 tons in 1967. In the latter year, almost 90 percent of the trees were in compact plantations.

Citrus growing is limited to the area south of about the isotherm of 4°C., in January. This includes coastal areas of Epirus and Central Greece, the Peloponnesus, and the islands. Since these are also the drier areas, irrigation is necessary, and quality of water in these areas is often a problem, as is drainage. Oranges were the most important of the group in number of trees, production, exports, and distribution.

Table 6.--Commercial vegetables, area and production, 1967

| Crop                                  | Area           | Production |
|---------------------------------------|----------------|------------|
|                                       | 1,000 stremmas | 1,000 tons |
| Tomatoes .....                        | 276.8          | 518.2      |
| Onions, dry .....                     | 120.9          | 110.2      |
| Green beans .....                     | 102.4          | 57.5       |
| Cabbage .....                         | 72.3           | 102.9      |
| Artichokes .....                      | 48.6           | 39.2       |
| Squash .....                          | 44.4           | 47.2       |
| Peas .....                            | 43.6           | 12.2       |
| Seedlings and flowers <u>1/</u> ..... | 80.2           | ---        |
| All other .....                       | 384.0          | ---        |
| Total .....                           | 1,171.2        | ---        |

1/ Nurseries of fruit and forest trees, ornamentals, seedlings, and commercial flowers.

Source: Compiled from (57).

Table 7.--Grapes and raisins, and other vines, area and production, 1967

| Vine                                  | Area           | Production     |               |                   |
|---------------------------------------|----------------|----------------|---------------|-------------------|
|                                       |                | Made into wine | For table use | Raisins <u>1/</u> |
|                                       | 1,000 stremmas | 1,000 tons     |               |                   |
| Wine grapes .....                     | 1,248.7        | 541.2          | 37.3          | 0.6               |
| Table grapes .....                    | 192.0          | 32.1           | 113.0         | 0.3               |
| For drying:                           |                |                |               |                   |
| Currants .....                        | 443.0          | 6.1            | 0.2           | 88.2              |
| Sultanas .....                        | 417.8          | 8.8            | 10.5          | 61.3              |
| Other .....                           | 14.0           | 3.1            | 0.2           | 1.3               |
| Total .....                           | 2,315.4        | 595.9          | 180.1         | 151.8             |
| Climbing and other vines <u>2/</u> .. | 2,271.0        | 4.5            | 18.8          | 0.1               |
| Total .....                           | 2,315.4        | 600.4          | 198.9         | 151.9             |

1/ Weight after drying.

2/ Total number of various vines not in compact plantations.

Source: Compiled from (57).

Table 8.--Tree crops, number of trees, trees in compact plantations, and production, 1967

| Kind                              | Number<br>of<br>trees | Trees in compact plantations |                        |           | Production |
|-----------------------------------|-----------------------|------------------------------|------------------------|-----------|------------|
|                                   |                       | Number                       | Percentage<br>of total | Area      |            |
|                                   | Thousands             | Thousands                    | Percent                | Stremma   | Tons       |
| Citrus:                           |                       |                              |                        |           |            |
| Oranges .....                     | 12,518                | 11,838                       | 94.6                   | 267,035   | 299,198    |
| Lemons .....                      | 5,028                 | 4,101                        | 82.0                   | 118,678   | 121,417    |
| Other 1/ .....                    | 1,798                 | 1,352                        | 75.2                   | 25,843    | 33,051     |
| Total .....                       | 19,344                | 17,291                       | 89.4                   | 411,556   | 453,665    |
| Other fresh fruits:               |                       |                              |                        |           |            |
| Apples .....                      | 6,030                 | 4,140                        | 68.7                   | 161,915   | 240,327    |
| Pears .....                       | 6,899                 | 1,861                        | 27.0                   | 67,692    | 122,695    |
| Peaches .....                     | 5,290                 | 4,735                        | 90.0                   | 128,730   | 154,609    |
| Apricots .....                    | 1,601                 | 1,055                        | 66.0                   | 30,933    | 38,418     |
| Cherries (sweet) .....            | 1,186                 | 487                          | 41.1                   | 21,575    | 23,537     |
| Fresh figs .....                  | 2,103                 | 75                           | 3.6                    | 4,440     | 48,617     |
| Other 2/ .....                    | 2,897                 | 627                          | 4.9                    | 17,485    | 117,658    |
| Total .....                       | 26,006                | 12,980                       | 49.9                   | 432,770   | 745,871    |
| Nuts and dried fruits:            |                       |                              |                        |           |            |
| Almonds .....                     | 6,544                 | 2,282                        | 34.9                   | 96,858    | 96,858     |
| Dried figs .....                  | 2,635                 | 1,720                        | 65.3                   | 127,315   | 23,473     |
| Carobs .....                      | 4,194                 | 1,845                        | 44.0                   | 113,768   | 48,315     |
| Walnuts .....                     | 2,095                 | 296                          | 14.1                   | 23,618    | 22,945     |
| Chestnuts .....                   | 1,476                 | 769                          | 52.1                   | 64,713    | 15,650     |
| Other 3/ .....                    | 1,217                 | 1,029                        | 80.8                   | 25,772    | 2,086      |
| Total .....                       | 18,217                | 7,941                        | 43.6                   | 452,044   | 209,327    |
| Olives 4/ .....                   | 91,928                | 73,018                       | 79.4                   | 4,842,178 | 1,088,486  |
| Miscellaneous tree crops 5/ ..... | 4,859                 | 2,275                        | 46.8                   | 52,068    | ---        |
| All trees .....                   | 160,354               | 113,505                      | 70.8                   | 6,190,616 | ---        |

1/ Includes mandarin, bitter orange, and citron.

2/ Includes sour cherries, quince, prunellas, and plums (fresh and dry).

3/ Includes hazelnuts and pistacios.

4/ Production included 1,025,686 tons for oil and 62,800 tons for table use.

5/ Includes mulberry, mastic, pomegranate, medlar, and bananas.

Source: Compiled from (57).



They are more tolerant of cold, hence, of the citrus group, can be grown furthest north. Epirus produced about 29 percent of the crop; the Peloponnesus, 44 percent; and Crete, 17 percent. The rest was scattered over the entire citrus area. Serious losses sometimes occur from frost in Epirus and elsewhere. Lemons were second in importance, with about 70 percent of production from the Peloponnesus. There was also significant production of mandarins, bitter oranges, citrons, and other minor citrus.

Deciduous fruits.--Production of these is another rapidly growing segment of Greek agriculture. In 1967, there were over 26 million deciduous fruit trees; about half these trees were in compact plantations and half were scattered. While these fruits are grown in all parts of Greece, production tends to be concentrated in certain areas because of climate, combined with availability of suitable soils and usually irrigation. Microclimate is very important to deciduous fruits, especially apples and peaches, which are grown mostly in the temperate zone of northern Greece.

An illustration of the intense concentration of deciduous fruits are the apples, peaches, and other fruit grown near the central Macedonian plain. There, three eparchies (subdivisions of provinces) contain a total of over 4 million deciduous fruit trees -- only three other eparchies in various locations in the country contain as many as half a million each. The Macedonian site is protected from the north winds that sweep down the Axios Valley, has adequate water, and has a great advantage in its location near railroad and highway routes to northern European markets.

Apples are the most widely grown of the deciduous fruits, but commercial production, especially for export, is concentrated in Macedonia, as is true for 80 percent of the peaches. Pear production is widely distributed, with main production centers in the Peloponnesus and in one small area in eastern Central Greece. Cherries are also widespread, but the bulk are grown in Macedonia and the Peloponnesus. About 35 percent of the apricots come from the northeastern part of the Peloponnesus. As indicated by the proportion of scattered trees, much of the production of these three fruits is not commercial. Fresh fig and the "other" fruit trees in this group are mostly scattered.

Dried fruits.--Included are tree nuts, carobs, and figs for drying. The total industry involves 17.7 million trees, with about 44 percent in compact plantations. The range was from 9 percent of all walnut trees to 65 percent of all fig trees. The latter proportion indicates the commercial nature of dry fig production. As a class, dried fruits are produced widely, but there are areas of concentration, such as the small but valuable crop of pistacios near Athens and on nearby islands.

Olives.--These trees made up over 56 percent of all trees reported. In 1967, a total of 91,928,000 olive trees were reported, of which 79.4 percent were in compact plantations. Some 1,026,000 tons of olives for oil were produced in 1967, compared with 63,000 tons of table olives. Production of oil was 201,164 tons.

Olive production is limited to areas with only light freezing in winter and fairly hot and dry summers. The trees can withstand drought, and can be grown on thin, stony, calcareous soils in areas with very limited alternatives. Because so many are grown under such circumstances, the average yield per tree is relatively low. The trees will respond, however, to fertilizer, irrigation, and favorable sites on limestone soils.

Production does not extend north beyond the southern coast of Macedonia and the low-lying coastal and southern areas of Central Greece. Major producing areas are the Peloponnesus, Crete, and the Aegean Islands.

## Livestock Numbers and Production

Numbers of the various kinds of livestock inventoried in Greece as of December 31, 1967, are shown in table 9. They are, in most cases, bulk figures and do not clearly differentiate breeding stock from other categories, except for pigs. Output of major products -- meat, milk, eggs, and honey -- is also shown. Total output of meat was 252,176 tons and milk, 1,265,200 tons. Per capita production was about 58 pounds of meat, 290 pounds of milk, and 200 eggs. These levels, with the 22 pounds dry weight of edible pulse per capita, provided a basic supply of protein in a diet that is much better than that of most developing countries in both quantity and diversity of food. Further supplements were fish and a significant quantity of imported animal-derived foods.

Much of the milk was processed, yielding the following products in 1967:

|   | <u>Tons</u> |
|---|-------------|
| Soft cheese .....                       | 84,340      |
| Hard cheese .....                       | 24,574      |
| Fresh butter .....                      | 4,810       |
| Melted butter .....                     | 1,102       |
| Myzithra (a high-fat soft cheese) ..... | 8,147       |
| Cream .....                             | 1,804       |

Other livestock products reported but not shown in table 9 are:

|                             |           |
|-----------------------------|-----------|
| Sheep's wool, tons .....    | 8,078     |
| Goat's-hair, tons .....     | 1,284     |
| Hides and skins:            |           |
| Small animals, pieces ..... | 7,070,544 |
| Large animals, pieces ..... | 416,171   |
| Silk cocoons, tons .....    | 630       |

Among valuable minor products are chinchilla and nutria skins, included above with small-animal skins.

### Cattle and Buffalo

In Greece, these multipurpose animals furnish milk, meat, and power. While distributed widely over the country, cattle are concentrated in the cooler and more humid areas, where better quality pasture, especially grass, is available. Thrace, Macedonia, and a hilly and mountainous part of northern Central Greece are such areas. Most of the buffalo are in northern Greece, where they furnish power in wet lands, but their numbers are declining rapidly as such areas are being drained, and power is increasingly supplied by tractors. Modest concentrations of cattle near Athens and Thessaloniki suggest dairying oriented to urban markets.

Production of cow's milk, a commodity for which there seems to be a strong demand, has been promoted by the Government through pricing and establishing of processing facilities. However, the quality of milk delivered to processors from the many small producers has been a problem, and much has been diverted to production of cheese of types not in strong demand in Greece. Imports of evaporated and dried milk have been increasing.

Beef animals and calves are traditionally slaughtered at light weights, and fat meat is not desired.

Table 9.--Animals, poultry, and beehives, inventory December 31, 1967, and production in 1967

| Class                         | Number    | Production |       |             |         |
|-------------------------------|-----------|------------|-------|-------------|---------|
|                               |           | Meat       | Other |             |         |
|                               |           |            | Item  | Unit        | Amount  |
|                               |           |            |       |             |         |
|                               | Thousands | Tons       |       |             |         |
| Cattle .....                  | 1,094.3   | 73,583     | Milk  | 1,000 tons  | 520.8   |
| Buffalo .....                 | 27.0      | 2,163      | do.   | do.         | 8.5     |
| Sheep .....                   | 7,873.8   | 56,948     | do.   | do.         | 415.5   |
| Goats .....                   | 4,041.8   | 27,568     | do.   | do.         | 320.4   |
| Pigs .....                    | 492.1     | 46,135     | Lard  | Tons        | 4,657   |
| Poultry                       |           |            |       |             |         |
| Hens .....                    | 24,959.8  |            |       |             |         |
| Other poultry <u>1/</u> ..... | 1,905.5   | 43,372     | Eggs  | 1,000 dozen | 145,929 |
| Rabbits .....                 | 1,350.7   | 2,407      |       |             |         |
| Horses, mules, and asses ...  | 874.8     |            |       |             |         |
| Beehives .....                | 991.0     |            | Honey | Tons        | 9,362   |
|                               |           |            | Wax   | do.         | 303     |

1/ Pigeons, turkeys, ducks, and geese.

Source: Compiled from (57).

### Sheep and Goats

Sheep and goats are basic and traditional in Greek agriculture. They are widely distributed throughout the country and are well adapted to the environment.

Sheep.--Of all animals in Greece, sheep are the most numerous; about 7.9 million were inventoried in 1967, almost equal to the human population of 8.7 million. Some concentration occurs in the semimountainous and mountainous areas, particularly in northern Central Greece, Thessaly, Epirus, and western Macedonia. Sheep are sparse in the lower and drier areas of Central Greece, the Peloponnesus, and generally on the islands, except for parts of Crete. Products from sheep, in descending order of importance, are milk, meat, and wool. Sheep's milk is primarily used for a type of cheese that is a staple in the Greek diet.

The traditional sheep operation is associated with villages in the semimountainous and mountainous areas. Flocks of 200-300 ewes are herded on pastures; each flock requires a herder and about two other people to help milk and take care of it. This is a declining industry because of labor shortages in the villages.

Goats.--These animals tend to predominate in the drier and hotter areas and on the roughest land although they and sheep are interspersed to some extent throughout the country. Again, milk is the dominant product and, although more important for direct consumption, much of it is used for cheese.

### Hogs

Hogs are growing rapidly in numbers, and pork was the third most important meat in 1967, though only slightly above poultry. These animals are not concentrated in any particular area.

### Poultry

Poultry has some concentration near Athens and Thessaloniki, reflecting the broiler and layer plants operating in these areas. In total, the bulk of poultry is widely dispersed on many farms.

### Draft Animals

Horses, mules, and asses are somewhat concentrated in field-crop areas. Their numbers are declining with the increased use of tractor power. They are most important in the semimountainous and mountain regions, where fields are small, irregular, and steep, and transportation and communications are difficult.



## CHAPTER II.--BACKGROUND

Greece encompasses 50,492 square miles, including the southern end of the Balkan Peninsula and hundreds of islands -- 166 inhabited -- that make up nearly a sixth of the land area. The largest island is Crete, with 3,218 square miles. The islands include the Ionian Islands to the west, and a large number comprising several groups in the Aegean Sea, extending to within a few miles of Asia Minor (Turkey). Total area of Greece is about equal to that of the States of Alabama, North Carolina, or Arkansas (see map inside front cover).

Greece is subdivided into 11 administrative regions, which also serve as units for reporting statistics. Islands of the Aegean Sea, not administratively part of a main-land region or of Crete, are called the Aegean Islands and are, in most cases, treated as a statistical unit in this report. However, they comprise three administrative regions -- the Dodecanesos, Cyclades, and Aegean Islands. Where data for the three Aegean regions are not shown separately in tables, or discussed separately in the text the term "Aegean Islands" should be understood as inclusive.

The next level of administrative subdivision is the nome, of which there are 52. The third level is the eparchie, of which there are 148. Much of the national statistical data is reported by eparchies. A fourth level is "municipality and commune"; the latter is rural and includes villages. There are 6,000 of these, the basic source units for collecting statistical information.

### Relevant History

Modern Greece has its roots deep in a past that is known from a long written history and antedated by a revealing archeological period. Here, Western civilization began. Greece has remained within the main stream of that civilization, and has continued to contribute to it. A brief review of major eras will provide a background for understanding present-day Greece -- its accomplishments and its problems. Some events bear directly on characteristics of the agricultural sector. Dates given are usually general (major sources were 7 and 18).

### Early Greece

Greece developed its distinctive culture under many empires, with many influences. The Mycenaean-Minoan civilizations were in Greece and the Islands in the 15th century B.C., and the Minoans are credited with the beginnings of Western civilization. After an intervening "dark age," Sparta, Athens, and the other city-states of classical Greece were in ascendancy by the 5th century B.C. In this period, all of the territory of modern Greece, and more, came under Greek influence. Under the succeeding short-lived Macedonian Empire, Greeks colonized from Egypt to the Indus River, spreading their culture throughout the Near East.

The Roman Empire evolved over a long period and assimilated important influences from Greek sources. Eventually a second capital in Byzantium (Constantinople) was established, and this survived as the Byzantine Empire after the fall of Rome. Again, Greeks dominated a large area surrounding the eastern Mediterranean. However, in the 12th century, a decline began, and by 1500, the Ottoman Turks had occupied Constantinople.



## Greece Under the Ottoman Empire

The immersion of Greece into the Ottoman Empire began in the 13th century, and Greece as a separate country did not begin to emerge until 1821 -- six centuries later. Turkish domination through 12 to 18 generations established institutional and cultural patterns deeply affecting Greece and its people. Turkish rule was arbitrary and harsh. The Greeks were allowed to maintain their religion and language, and thus perpetuated their Greek identity. But Turks occupied the best lands and estates and controlled the major economic opportunities. Most Greeks were reduced to being serfs, servants, or small shopkeepers, or to doing whatever menial tasks they could find. Many moved to the mountains and established agricultural villages in sites where only the barest subsistence was possible. Thus arose the segment of Greek agriculture that is most traditional, in the sense of isolation, with little expectation of modernization. After 10 years of struggle that began in 1821, and supported by European powers, Greece gradually attained her freedom from the weakening Ottoman Empire.

## Modern Greece

The Peloponnesus and Central Greece attained independence in 1830. Other dates in the development of modern Greece are difficult to establish because of the ebb and flow of wars won and lost, and the many treaties, protocols, and cessions. Boundaries were constantly adjusted during the Balkan Wars and the two world wars; and the final major addition to Greece was the Dodecanesos, after World War II.

During this period of consolidation of territory, considerable land accrued to the State; many private, small holdings were formed; and the retreating Turks sold estates to wealthy Greeks who perpetuated serfdom, exploitive sharecropping, and other repressive forms of tenure. Greeks who had become established in Turkey during the centuries of Ottoman rule and who remained there after independence generally suffered economic disadvantage and were at times severely persecuted. Turks in Greece were little better off. When Greece and Turkey agreed in 1923 to permit the return to both countries of most of their own nationals, about 1,220,000 Greeks returned to Greece, and an estimated 600,000 Turks left. The great influx of repatriated Greeks occurred during the first 2 or 3 years, but the flow continued until 1936.

Greece was not prepared to assimilate these people, equal to almost a fourth of its population before the exchange. Returnees were landless, and they flocked to the cities. Industry, commerce, and service industries offered few opportunities. In extreme hardship, those who survived did so on relief and little else. The only solution seemed to be to provide land, at least for subsistence, which the Government did by any means possible. Land vacated by Turks was quickly occupied. Returnees were added to established villages if undeveloped land could be found, or if land could be appropriated from large holdings. New areas were opened, and new villages founded. Assimilation of this population precipitated land reform, resulting in an agriculture structure of small private holdings.

Greece had been isolated from the modernizing effects of the industrial revolution occurring elsewhere in the world. By 1913, sufficient territory had been consolidated to provide an adequate resource base for national development. But Greece was buffeted by two world wars, and was occupied between them with the expensive process of assimilating population and the other problems of a new State. Not until 1949 was the nation ready to grow.

## Natural Resources

An outstanding feature of Greece is its great diversity. It is mountainous and hilly, with topography dominated by the Pindus Mountains extending from Albania, roughly separating Macedonia from Epirus, through Central Greece to the Gulf of Corinth. Similar mountains extend across the Peloponnesus and through Crete. Elevations over 3,500 feet dominate in the north and are less frequent further south, but throughout the country, scattered peaks exceed 6,500 feet. Another prominent range extends westward across Macedonia from the central Bulgarian border and thence parallel to the Aegean coast into Thessaly. It includes Mount Olympus, the highest point in Greece -- about 9,600 feet. At the other topographical extreme are the plains, principally riparian, coastal, and lacustrine. The most important is the "Thessaloniki Plain," which is the alluvial outwash of the Axios and Aliakmon River systems. Some important interior plains are recently drained marshes and lakes. The semimountainous areas between the plains and mountains vary from rolling hills and ridges to very rough and steep terrain.

Sedimentary rocks are associated with the Pindus range, and branch eastward to include most of eastern Central Greece and Euboea, extending through the Peloponnesus, practically all of Crete, and on through Rhodes. Most of these are relatively recent -- Cretaceous or later -- and limestone occurs very commonly. Metamorphic rocks predominate from Thrace westward through central Macedonia, and south through Thessaly. They reappear again in southern Euboea and Central Greece, and through the islands of the Cyclades, Samos, and Kos. Igneous rock groupings are scattered throughout the area of metamorphic rock, but are rare in the sedimentary areas.

### Mineral and Other Resources

These have direct implications for the agricultural sector. They partially determine potential for viability and active growth in the industrial and commercial sectors. With about half the population rural, prospects for absorption into other sectors are important. Secondly, strong market demands for agricultural products largely depend on a nonrural population that is growing both in numbers and economic strength.

The variety of basic industrial materials available includes magnesite, iron ore, iron pyrites, manganese ore, bauxite, barite chromite, emery, lead pyrites, marble, pumice, Santorin earth, and lignite. While currently a large proportion of the major minerals being mined are exported, some intermediate concentrating and processing is done, and further fabricating can be expected to develop. Except for lignite and bauxite mines, the western area of Greece has no mines. The supply of lignite is especially important to the national economy because so far as is known Greece has no other fossil fuels.

### Energy

Four sources are lignite, hydroelectric power, imported fuels, and wood and wood products. The last source is of great importance, but primarily serves domestic needs in rural areas (towns and villages). Lignite has direct industrial and domestic uses, but recent large increases in production have been for electric power, with the establishment of generating plants at mining sites. Imported fuels are used to produce electricity for smaller markets, such as on the islands; for direct industrial consumption, such as nitrogen fertilizer manufacture; and for transport.

Hydroelectric development is the primary source of electricity. It is of special significance to agriculture because of the multipurpose effects of major installations, which provide the water storage and stream-flow regulation needed for major irrigation projects. Greece is still developing and expanding its national grid to towns and villages to meet demands for higher levels of living and to promote expansion and wider distribution of industry and commerce.

## Climate

This varies from mediterranean in the south to continental in the north. The south has a fairly rainy season from October through April or May and a very hot and dry summer accompanied by almost continuous southwest winds. The northern continental area, too, has most of its precipitation in the winter, when cold continental air is dominant and freezing temperatures are common for several months. The mediterranean climate extends through the northern and eastern reaches of the Aegean Sea to the southern coasts of Macedonia and Thrace. The Aegean Islands tend to be dry, as is the Athens area. The climate of the western coastal area is modified by the Ionian Sea, an arm of the Mediterranean. The mountains are cool and wet and are very important as sources of irrigation water and as lush summer pastures.

Precipitation in the wettest areas -- that is, the highest mountains of western Macedonia, Epirus, Central Greece, and Crete -- is over 70 inches annually. In contrast, rainfall is less than 16 inches in parts of Crete, many of the Aegean Islands, the southern parts of the mainland, and in areas along the Macedonian coast. Temperatures vary widely too. Annual averages are from 67° F. in the south to 57° in the north and in the mountainous areas. January averages range from 55° in mediterranean areas to 37° in the coldest areas of northern Macedonia. All Greece is hot in the summer, with July means varying geographically from 75° to 82°.

## Soils

These are the results of interaction among parent materials, topography, climate, time, and use. No generalizations are possible about Greek soils. Parent materials, topography, local climates, and geological ages are extremely variable. Except in more remote regions, use by man has been intensive since antiquity. Instead of the usual soil classification that would be appropriate where broad soil areas exist, the following approach was used as more appropriate for an understanding of Greek agriculture.

So-called "fertile" soils in Greece are the deep lacustrine and alluvial types, especially those that are irrigable. Not only are they inherently fertile, but they respond well to proper irrigation practices, liberal inputs of fertilizers, and adapted crop varieties. These soils contribute substantially to total crop output and also represent major opportunity for further growth of the agricultural sector. They are about the only level lands in Greece and are not subject to serious erosion. But they are often flooded, and drainage is a problem (initial drainage has often been the first step in their development). Many level areas of less fertile land are important locally, because they are often the only croplands available. Their soils may be thin, gravelly, and rocky; saline; or dry and without water for irrigation. But the areas are flat, and available for farming.

Semimountainous areas are the second most important source of crop production in Greece. Some of these areas are fertile, can be irrigated from wells, and can be used for high-value crops. Outstanding in this group are the deciduous fruit and table grape areas of Macedonia. Across Thrace and Macedonia and into Thessaly, much of Greek feed grains and wheat are produced on this type of land. Such land was long the primary source of cotton. Olives and other tree crops are major uses in the south. Where the land grades into the roughest semimountainous types, cropping may be limited to trees. Rougher and less hospitable, these lands supply a large proportion of permanent pasture area. They also tend to be badly eroded. In many areas, they have been used intensively for centuries, without regard to soil-conserving practices. Other areas have been overgrazed, particularly by sheep and goats, and the character and amount of the original topsoil can only be subjects of speculation.



Mountainous areas support agricultural villages in scattered and often remote and unfavorable sites, where the major agricultural resource is pasture. Substantial areas are forested, and much of the land is rocky and inaccessible, or otherwise unproductive. Where the limited cropable lands in these areas are operationally associated with pastures, they play a critical role as the feedbase for livestock. In the northern winters and not infrequently during dry summers, hay and grain are needed for livestock. These croplands also provide subsistence food crops and such cash crops as the very important oriental tobacco, wheat, and many others.

### Rural Settlement

The village type of rural settlement prevails throughout Greece. The cluster village, without direct association between the residence and the land, seems to predominate. However, other common village types are represented, including the various arrangements of strip villages, where at least a part of the agricultural landholding is associated with the residential site. The village pattern has advantages, such as those associated with assembling produce for market, distributing inputs, supplying basic social services -- schools, churches, government, and social centers -- and providing communications, transportation, and other utilities. Generally, the farmer would gain little convenience and efficiency by living on any one of the several dispersed tracts that characteristically make up a Greek farm (24).

Villages are peripheral to the plains areas, such as the Thessaloniki Plain, the valley of the Evros River, or the lakes and marshes that have been drained and developed. They are located where drainage is assured, and where they are sheltered from winds and storms. These features also provide access to pastures for livestock.

### Size of Farm

The prevailing characteristic, not unique to Greece, of farms made up of several noncontiguous tracts, or "parcels," complicates evaluation of farm size. However, Greek farms are small, in any of the terms in which size might commonly be expressed -- physical area, gross value of product, or capitalization. Data are reported in terms of "holdings," which are ownership units. Most of these are operated as individual farms, and are assumed to be farms in this report. The number of holdings owned by non-farm people and farmed in combination with other holdings is not yet on a scale sufficient to invalidate considering the size of the holding as the size of the farm.

Only cropland was considered in describing size of farm in the study. Omitted were pastures and grazing land, mostly in community pastures of common use. Only about 11 percent of the holdings included pastures in the 1961 census. The pasture area was about 25 percent of the area of cropland reported, while all grazing land accounted for about 40 percent of the area of Greece and cropland, 30 percent.

### Size

In 1929 the average size of farm in Greece was 37.7 stremmas; in 1950, it was 35.8 (56). The constitution of 1952 limited the maximum size of farms to 300 stremmas. The OECD suggested that this limit was the main factor in increasing the number of farms of 10 to 50 stremmas by 5 percent and decreasing those over 200 stremmas by 25 percent between the 1950 and 1961 censuses. In 1961, a farm averaged 31.8 stremmas. Figures for the 1966 crop year show that size of farm had not changed noticeably after 1961 (41). Of the total number of farmers in Greece, about 80 percent had less than 50 stremmas of cropland in 1961 and almost 50 percent of the agricultural land (table 10). All farms less than 100 stremmas included 90 percent of the farms and 80 percent of the cropland,

Table 10.--Size distribution of farms, 1961 1/

| Size<br>of<br>farm | Farms         | Area           |                       |                |                 |
|--------------------|---------------|----------------|-----------------------|----------------|-----------------|
|                    |               | Total          |                       | Per farm       |                 |
|                    | <u>Number</u> | <u>Percent</u> | <u>1,000 stremmas</u> | <u>Percent</u> | <u>Stremmas</u> |
| Hectares:          |               |                |                       |                |                 |
| 0.1-0.9 .....      | 261,772       | 23.0           | 1,320                 | 3.6            | 5               |
| 1.0-4.9 .....      | 658,431       | 57.8           | 16,583                | 45.2           | 25              |
| 5.0-9.9 .....      | 172,746       | 15.2           | 11,432                | 31.1           | 66              |
| 10.0-19.9 .....    | 38,912        | 3.3            | 4,981                 | 13.6           | 128             |
| 20.0-49.9 .....    | 6,863         | .6             | 1,853                 | 5.0            | 270             |
| 50.0 or more ..... | 655           | .1             | 563                   | 1.5            | 860             |
| All farms .....    | 1,139,379     | 100.0          | 36,733                | 100.0          | 32              |

1/ Size of farm measured in terms of cropland.

Source: (64).

which still averaged only 27 stremmas per farm. According to the constitution, no farms over 300 stremmas should exist except possibly some institutional farms such as those connected with schools and research stations. Yet 655 farms of 500 stremmas or more were reported but not explained.

Persistence of small farms is one obstacle to increasing farm income and efficiency. The scale of individual enterprises is very limited (table 11). These small areas would preclude use of major machines. Figures in the table are only averages, and include some much larger enterprises and many smaller ones. Because of fragmentation of farms, these enterprises tend to be in two or more separate plots on most farms.

Thessaly and Thrace, the two regions with the most rapid growth in agricultural production from 1954-56 to 1965-67, have the largest farms. In 1966, cropland in farms averaged 38.94 stremmas in Thessaly, 38.24 in Thrace, and 34.11 in central Macedonia. The smallest farms were in Epirus, with only 18.19 stremmas of cropland.

### Parcelling

In 1961, over 95 percent of the farms reported parcels; the average was more than seven per farm. The area of individual parcels averaged 4.53 stremmas. The 53,652 holdings not reporting parcels averaged 2.13 stremmas, about two-thirds the size of the average holding that was parcelled (24, tables VII, 1, and 2). Thompson cites an extreme case of a holding of about 150 stremmas in 80 parcels (24, p. 1, f.n. 1).

Fragmentation adds the time factor of moving from field to field, reducing productive worktime in each field, and limiting use for crops that require frequent attention. Size of field impedes investment in development such as irrigation wells and drainage, adoption of mechanization, and application of other modern technology.



Table 11.--Average area per farm of crops with largest average area on farms, 1966

| Crop               | Growers       | Area            |                 |
|--------------------|---------------|-----------------|-----------------|
|                    |               | Total           | Average         |
|                    | <u>Number</u> | <u>Stremmas</u> | <u>Stremmas</u> |
| Rice .....         | 11,287        | 184,264         | 16.3            |
| Wheat .....        | 639,980       | 10,159,698      | 15.9            |
| Cotton .....       | 96,451        | 1,429,204       | 14.8            |
| Olives .....       | 473,470       | 6,127,250       | 12.9            |
| Other grains ..... | 440,448       | 4,511,018       | 10.2            |

Source: (41).

Required access to each parcel involves loss of a high proportion of land in field boundaries, which are also the access routes. These routes tend to exclude use of tractors because the typical access strip is little more than a footpath in width. Fragmentation also leads to frequent disputes over alleged or actual trespass. Fragmentation has not been of much concern until recently, when potential benefits of development programs and projects have been reduced because of it.

Thompson categorizes fragmentation as rational, incidental, or irrational. Division resulting from unavoidable causes or in the interest of agricultural convenience and efficiency is considered rational. Included are farm expansion by renting or buying land and, most important, efforts to adjust to the environment and to balance the farm organization by combining lands of different qualities. Incidental division comes from causes unrelated to agriculture, right-of-way being the most common. The extent of both rational and incidental fragmentation is minor.

Irrational fragmentation is defined by the result: "division of land holdings into a great many awkwardly shaped plots, which serves few, if any, considerations of agricultural efficiency or convenience" (24, p. 10). Inheritance and dowry customs cause most irrational division. The Greek civil code permits any form of division in inheritance. Heirs tend to want to share in all grades of land and in lands planted to perennial crops. Sharing perennial cropland especially tends to lead to greater fragmentation, as evidenced by one village cited by Thompson, where annual crop plots averaged 4.3 stremmas and olive plots, 2.5 stremmas.

The dowry, universal in rural Greece, is usually several plots of land, representing the diverse holdings of the donors. Thus, it multiplies ownership and leads to subdivision of farm properties. Even though the size of an individual holding (farm) might not change between generations, as in the case of a one-son and one-daughter family, the exchange of dowries when each is married can greatly increase division.

Some general economic forces intensify the tendency to fragmentation. Land scarcity -- and, hence, the exaggerated value and significance attached to land -- leads to punctilious and minute division for inheritance or sale. Land scarcity is in part a function of the shortage of nonagricultural employment opportunities. Similarly, the structure of the financial organization of industry and commerce limits the availability and appeal of investment opportunities and creates a preference for real estate investment (20). This leads to a proliferation of minor land transactions.

## Tenure

Tenure includes not only the simple right to use land, but all factors that modify that right -- ownership, leases and contracts, duration of the right, taxation and other attendant responsibilities, inheritance laws and customs, indebtedness and mortgages, and other related factors.

In a sense, land tenure in Greece is simple, straightforward, and without many of the complications that often pose serious problems in other developing countries. About 92 percent of the land in farms was owner operated at the time of the 1950 census. In 1961, operators of about 98 percent of the holdings were reported as owners. Ownership is generally without encumbrance, farms are not taxed, and tenure is freely transferred by inheritance, gift, or sale.

Sale of land is not important in land transfer. Ownership of land is a status symbol of such magnitude that few sales occur. However, dowry gifts loom large in land transfers and, as mentioned earlier, are one of the major factors in the fragmentation of holdings, the primary tenure problem in Greece. Inheritance, the most important means of transfer, has the same result. As long as the size of the farm population remains rather stable, as it has in Greece, the size of farms does not change much between generations. Inheritance may divide holdings among children, but inheritances by husband and wife, dowries, and other acquisitions tend to maintain the average size of individual farms, even though the number of tracts per farm is increased in the process.

While individual ownership is characteristic of crop farms and cropland generally, most pasture and rough land has not been privately owned. Rather, such land tends to be communally owned by villages or held by the State. Because of this, there is little incentive for improvement of this pasture, and control over the number and distribution of grazing animals is not effective. A system of seminomadic husbandry has thus been encouraged, while an integrated mixed-farming organization has been discouraged. Under this situation, pastures in foothills and mountains have deteriorated.

## Type of Farming

The organization of farming in Greece is as varied as the commodities produced. One type of classification relates to the degree of diversification, which ranges from farms that produce all major commodities grown in an area to farms that are highly specialized. Another, and perhaps more meaningful, classification relates to commodities of each area, and to the organization under which each commodity is produced.

## Organizational Types

As a rule, the highly diversified farm has a strong subsistence orientation, but produces one or more significant commercial crops and is located in the semimountainous or mountainous areas. The farm's major commercial crops are characteristic of the area.

Associated with these combinations of crops on diversified farms are livestock enterprises. What is described as the "Noah's Ark" system is widespread -- every farm having most kinds of livestock (40). As with crop enterprises, small livestock enterprises are oriented to subsistence, and larger ones are commercial. For both crops and livestock, the small subsistence enterprises are typically those less adapted to the area, less well managed, and less efficient.

Size distribution of individual crop enterprises per farm for the principal crops in 1966 was:

--

| Individual crop enterprises | Proportion of total area of principal crops |
|-----------------------------|---|
| <u>Stremmas</u>             | <u>Percent</u>                              |
| Less than 5 .....           | 13  |
| 5-9 .....                   | 43  |
| 10-14 .....                 | 23  |
| 15-19 .....                 | 9   |
| 20-24 .....                 | 7   |
| 25-29 .....                 | 4   |
| 30-34 .....                 | 1   |

Source: (41).

Almost 80 percent of the total area of the principal crops was dispersed in individual crop enterprises smaller than 15 stremmas. Further, because of fragmentation, it is likely that each enterprise comprised more than one field on most farms. These findings demonstrate the combined effects of small farms, fragmentation, and diversification, and their implied effects on modernization of production.

#### Commodity Types

The more specialized farms, emphasizing commercial production of one or a few commodities, are typical of the fertile plains and certain favored semimountainous areas. There are a few specialized dairies, egg and broiler plants, hog enterprises, and the like, but most specialized farms primarily produce field and tree crops. Wheat and other small grain production is concentrated in the valley of the Evros in Thrace. Here the winter crop, harvested in June, is said to have the appearance of large fields -- despite the many small parcels -- because of the ubiquitous wheat. Corn is the major summer crop on these same farms, usually in sequence with barley. The Thessaloniki Plain is similar to the Evros Valley, except for less double-cropping to provide room for sugar beets and cotton -- crops of longer season. According to reports in the 1950's, single-crop farming with tobacco was carried on in eastern Macedonia and western Thrace (68). Typically, commercial deciduous-fruit growers in Macedonia also grow forage crops, which implies associated livestock enterprises that use seasonal grass on the rougher lands.

Small-grain and corn specialization extends through the plains areas in Epirus and central Greece; in some areas, it is associated with cotton. Citrus is a speciality crop in southern Epirus and further south, as are currants and raisins, on a lesser scale. Throughout southern Greece and the islands, some areas are entirely in grapes or olives.

Wheat is a major commodity on commercial farms, but it is also the most universal subsistence crop. In the mid-1950's, only 43.7 percent of the wheat produced was marketed, on the average. Of farmers growing wheat, 48 percent marketed none; these growers planted from 0.1 to 1.0 hectare and they produced only 15.5 percent of total wheat. Conversely, 12.6 percent of farmers growing wheat planted 3 hectares or more,

and sold 68 percent of the wheat marketed. Those farmers growing over 20 hectares of wheat were only 0.1 percent of the wheat growers, but they marketed 85 percent of their wheat (68). The pattern of barley production is similar to that of wheat but more is used as livestock feed on farms where it is grown. It is also an important commercial crop, both for feed and nonfeed uses.

### Commercialization

In a country like Greece, with roughly 50 percent of the population rural, a general measure of commercialization is that the average farm family produces enough food for itself and one other family (adjusted, of course, for exports, imports, and other factors). This situation is in marked contrast with that in the United States, where only 5.5 percent of the population was classed as farm in 1967. This suggests three characteristics of Greek agriculture -- its labor productivity is low, it is strongly subsistence in nature, and yet, it is sufficiently commercial to feed the non-rural half of the population and to supply an important volume of export commodities.

Because the farms of Greece are universally small, the sources of farm products are dispersed. The implication for the marketing system is that it must assemble small individual lots of commodities from many farms and concentrate them in central locations. The village type of rural settlement provides the opportunity for initial concentration. The towns form the next order of nuclei. They are generally oriented to transportation routes from tributary villages to the cities. Greek towns are agricultural villages themselves, augmented in scale to provide services and serve as commercial centers. They often include small industries and are to some extent commercial consumers of farm products, and often intermediate processors. The system flows from towns to major processing, consuming, and exporting centers.

Market structures vary, depending on many factors including the commodity itself; market destination; location of producer relative to markets; customs and habits; transportation facilities and requirements; and personal preferences. The continuum includes fully unified systems operating between producer and consumer; a series of different entities operating at village, town, processing, wholesaling, and retailing levels; and the producer himself advancing the product, often to the retailing stage. In this last case, individual and total volumes are small, and retailing is local in relation to point of origin. Various forms of the second type, where ownership and control change hands in the marketing process, are the most common, and handle the bulk of commercial agricultural commodities.



### CHAPTER III.--CHANGES IN INPUTS AND PRODUCTIVITY

Land is the most scarce factor of production in Greek agriculture; thus, increased productivity per unit of land area is basic to increasing output. Labor is in over-supply, with some exceptions. Increasing its productivity through intensification of production and moving excess population out of agriculture are major development goals. Increasing the productivity of this combination of scarce land and excess labor depends on expansion of investment and operating capital.

#### Total Inputs

In a calculation of the proportionate distribution of various input categories in agriculture in terms of market price, labor is the residual claimant because it is the least scarce input (table 12). Proportionate allocation to labor has decreased steadily over the period. After an initial increase to 1952-54, land has also become less important, but only moderately so. On the other hand, proportion of capital inputs has increased sharply, from small beginnings. In 1948-50, Greek agriculture tended to be largely man and land, but the application of capital has steadily increased since then.

Data are not clear on the point, but apparently capital invested in land expansion and improvement is identified with the land item rather than capital (table 12). Otherwise, relative importance of land would have decreased to a considerably lower level than it actually reached, and capital would have gained more. "Other capital" in the table includes such items as basic livestock herds, certain production facilities, pesticides, and other annual inputs.

#### Cropland

The land available for use as cropland is the major constraint on growth of agricultural output in the long run. Expansion can take place in two directions -- increasing the area of cropland and increasing yields. The first is governed by national boundaries and the character of the land area included in relation to demands of the population and historical development; the second, by increasing productivity through individual and collective application and management of other production factors in relation to land -- land development and use, and application of technology and the best farming practices.

#### Area

By World War II, most of the potential cropland in Greece had been put into use, and from 1948 to 1967, increases in the area of cropland were small (figure 6). The annual growth rate of 0.8 percent from 1948 to 1967 matched the rate of population increase. The source for this series of growth rates is annual Food and Agricultural Organization (FAO) production yearbooks. Their series covers the study period, and reports slightly less agricultural land area in recent years than the areas reported as "area of agricultural land" in Agricultural Statistics of Greece. FAO defines "arable land and land under permanent crops" as "land under crops (double-cropped areas are counted only once), land temporarily fallow, temporary meadows for mowing or pastures, land under market and kitchen gardens (including cultivation under glass), and land under fruit trees, vines, shrubs, and rubber plantations" (38). FAO recognizes inconsistency of interpretation among countries, but since these statistics are reported by the individual countries, changes from one year to the next should be realistic.



Table 12.--Distribution of inputs used in the agricultural sector,  
selected periods

| Inputs              | Period         |         |         |         |         |
|---------------------|----------------|---------|---------|---------|---------|
|                     | 1948-50        | 1952-54 | 1957-59 | 1961-63 | 1965-67 |
|                     | <u>Percent</u> |         |         |         |         |
| Land .....          | 15.5           | 16.2    | 15.6    | 15.1    | 14.2    |
| Labor .....         | 65.0           | 60.7    | 56.4    | 53.9    | 47.5    |
| Capital .....       | 19.5           | 23.1    | 27.9    | 31.0    | 38.3    |
| Fertilizer .....    | 1.3            | 2.3     | 3.3     | 3.9     | 5.5     |
| Machinery .....     | 1.7            | 1.6     | 1.8     | 2.3     | 3.0     |
| Feed and seed ..... | 11.1           | 13.1    | 16.0    | 17.9    | 22.0    |
| Other capital ..... | 5.4            | 6.1     | 6.8     | 6.9     | 7.8     |
| Total inputs .....  | 100.0          | 100.0   | 100.0   | 100.0   | 100.0   |

Source: Based on data from (23) and (52).

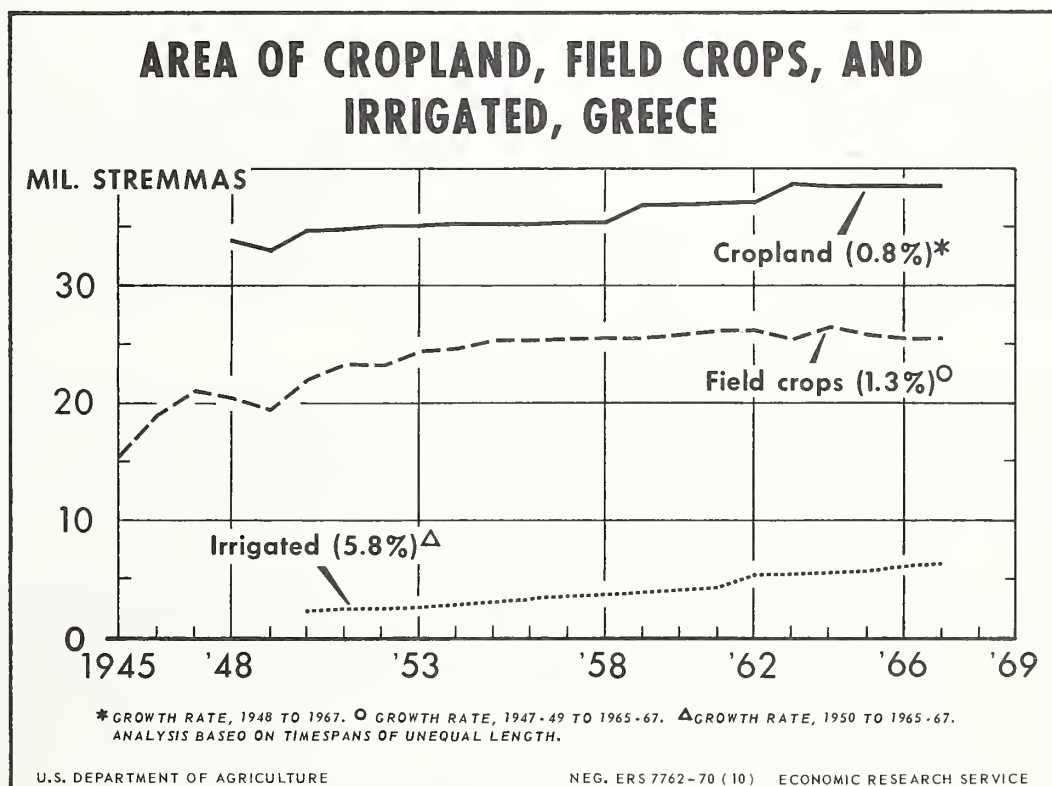


Figure 6

Drainage of marshes, lakes, and flood plains has been important in providing cropland in Greece. Much of this drainage preceded World War II, but it was also a factor in growth between 1947 and 1967. Irrigation of otherwise arid and unproductive sites has likewise added land not previously considered arable but irrigation contributed only in a small way to growth during these years. More important has been the aggregate expansion of village lands by clearing or extension onto poorer lands. Even planting olive trees in "compact plantations" on marginal sites adds to cropland.

### Productivity

With cropland increasing only very slowly, most of the 4.4-percent annual increase in crop output must be accounted for by increases in productivity. The two major elements are increasing yields and shifting of land use to higher value crops.

Irrigated land.--The irrigated land area, reported annually by FAO since 1950, increased at 5.8 percent per year from 1950 to 1965-67 (fig. 6). Earlier data show only about 1 million stremmas in 1935; this area had increased to almost 2 1/2 million by 1950, about 11 percent of the cropland; and to over 6.2 million by 1967, about 16.1 percent of the cropland. Growth of irrigated land has been a major factor in increasing productivity of cropland.

In 1967, about 4,245,000 stremmas of field crops, 809,000 of vegetables, 146,000 of vines, and 1,094,000 of trees were irrigated. This field-crop area is almost 100,000 stremmas more than the area of all land under irrigation; arising from double counting of interplanted crops, including other crops in compact plantations of trees. Crops grown during the rainy season on land developed for irrigation, either in sequential plantings of field crops or interplanting of trees, are not counted as irrigated if they in fact depend only on direct precipitation.

Field crops.--These occupied about two-thirds of cropland in 1967, and had grown a little faster in area than other crops over the study period. Because field crops were major users of land and produced about 55 percent of the value of crop output, changes in productivity of land in field crops is illustrative of all crops. The index of land input in field crops, derived directly from data for the preceding figure, repeats the 1.3-percent annual growth rate over the study period, and no significant increase occurred after 1955 (fig. 7). Output had an overall growth rate of 5.7 percent, growing strongly from 1947-49 to 1965-67, with the exception of the third subperiod.

The index of productivity is a yield concept, arrived at by dividing value of output by area. Like output, productivity grew strongly over the period and showed sharp annual variations. Growth was interrupted in the third period and showed yields of field crops as the major factor in the lack of agricultural growth at that time. Since field crops include grains and forages, this interrupted growth could have had secondary depressing effects on livestock production.

Further analysis, using the "residual" method to calculate sources of change in output of field crops, supports the above analysis. This method allocates to change in area, the change in proportionate composition of the regimen of crops (shifts to higher or lower value crops), and the residual that is identified as changes in yields. Of the total increase between 1947-49 and 1965-67, 16.8 percent is attributed to increase in land area, 9.6 percent to composition, and 73.6 percent to yield increases.

The same method was applied to data for selected regions and for the shorter period, 1952-54 to 1965-67, for which data are available. Results continue to show

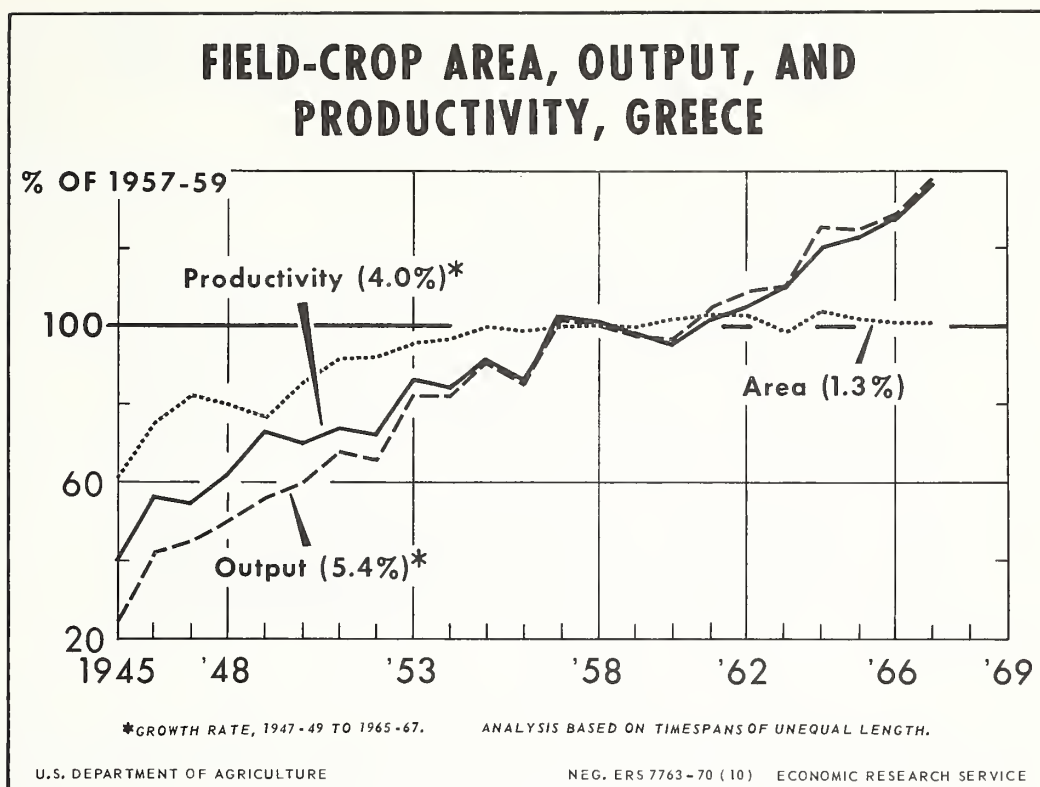


Figure 7

yields as the major source of change; land change was minor and even negative for field crops in some regions, and composition assumed relatively greater importance than it had before (table 13). Increases in land area in field crops were significant in Thrace and Macedonia, while such land area decreased in the other three regions. Composition changes were very important in Epirus and the Peloponnesus. Yields were consistently the major source for change and accounted for almost all net change in Central Greece. For Greece as a whole, in this shorter period compared with the longer period, land area declined in importance, composition increased, and yields were about the same.

### Labor

The supply of labor in agriculture is a very significant characteristic of the development process. Developing nations tend to be predominantly agricultural in their early stages. Development objectives include expansion of manufacturing, commerce, services, and other nonagricultural sectors that will not only provide growing markets for agricultural products, but will absorb population increases and provide economic opportunities sufficient to reduce the population in agriculture. Success in meeting these objectives depends on several factors, the major ones being initial population distribution, rate of population growth, and ability to provide opportunities outside the agricultural sector.

Table 13.--Sources of change in field-crop output, selected regions,  
1952-54 to 1965-67

| Source of change  | Region  |           |                |        |                  | Greece |
|-------------------|---------|-----------|----------------|--------|------------------|--------|
|                   | Thrace  | Macedonia | Central Greece | Epirus | The Peloponnesus |        |
|                   | Percent |           |                |        |                  |        |
| Area .....        | 19.4    | 19.5      | -13.4          | -9.4   | -28.5            | 9.1    |
| Composition ..... | 14.3    | 12.4      | 15.9           | 49.3   | 58.2             | 15.0   |
| Yield .....       | 66.3    | 68.1      | 97.5           | 60.1   | 70.3             | 75.9   |
| Total .....       | 100.0   | 100.0     | 100.0          | 100.0  | 100.0            | 100.0  |

Source: Methodology from (23); data from (23) and (52).

### Total Population

The population of Greece has grown at the very low rate of 0.8 percent compounded annually (fig. 8). From 1948 to 1967, the cumulative increase was only about 17.2 percent. From 1952 to 1967, in only 1959 and 1967 was the increase over the preceding years as much as 1 percent, and in 1964, this increase was as low as 0.36 percent. The low population growth rate arises from, first, a low effective birth rate, and second, a high rate of emigration. An estimate based on emigration data from 1955 to 1966 indicates that the rate of population growth would have almost doubled in that period had the emigration of about three-fourths of a million people not occurred. Emigration has increased markedly in recent years because of employment opportunities in the rest of Europe. The increased rate of population growth in 1967 was due to those returning as a result of a business recession centered in West Germany.

### Agricultural Population

The number of people in agriculture has been fairly constant, with a slight downturn recently. Of the total population, about 64.5 percent were in agriculture in 1948, and this proportion had declined to 52.4 percent by 1967. These proportions are high, yet Greece has had moderate success in moving population out of agriculture. The main factor making this shift possible is the low growth rate of the total population compared with those of most developing countries.

Population data overestimate the population that actually depends directly on agriculture -- farmers or farm laborers, and their families. One reason for overcounting is that the FAO definition includes forestry, hunting, and fishing as agricultural occupations, while this study does not include output of these activities in agricultural production. More important, the definition of the agricultural population in Greece is, in some measure at least, related to residence in agricultural villages. Thus, it includes an undetermined number of village people who provide local services and are not strictly agricultural. However, in the productivity analysis, the low per capita incomes would generally apply to such people because their levels of living depend on incomes of the village farmers. The scale of such overstatement of the agricultural population is purely speculative, but it might be as much as 5 percent or more of the population, which makes the agricultural proportion less than 50 percent.



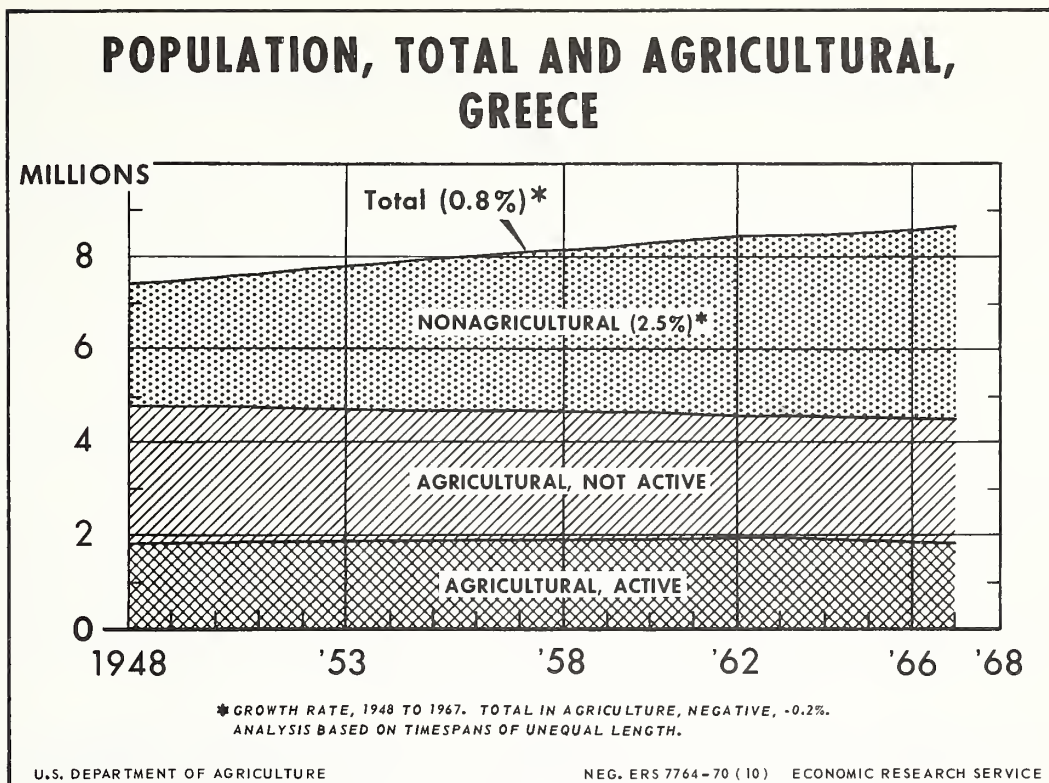


Figure 8

## Agricultural Labor Supply

Those defined as active in agriculture include about 45 percent of the total people in agriculture. This percentage is quite close to that for farm population and number of persons employed on farms in the United States, although the latter would include a larger proportion of hired workers. The average Greek farm family comprises about four persons, of whom almost two are active in agriculture, and the average size of farm is 31.8 stremmas (about 8 acres).

## Labor Supplies

Despite the persistent excess population in agriculture, scarcity of labor is showing up at some points. One shortage is in cotton picking. Cotton production has migrated from the traditional semimountainous areas to the irrigated plains. Cotton producers do not find large supplies of surplus labor available for a seasonal job -- even the underemployed or those with low pay in the cities will not interrupt whatever they do regularly for the higher rate of pay during a short season. Aside from use of some mechanical picking, labor must be found to supplement family labor. Hence, many growers travel considerable distances into the semimountainous areas to organize and transport picking crews.

Another shortage is in herders for sheep in mountain villages. Sheepherding has traditionally been a prestigious position for local specialists, but younger men who might have entered it in an earlier time are now the ones who leave the villages.



Where olives are grown, the harvest is the great seasonal task. In a good olive year, as much as 1 million tons are harvested by hand -- over 1 million tons, about 26.5 pounds per tree, were reported in 1967. So far, labor seems to have been available -- partly because other farmwork is at low ebb in the olive harvest season. Even more important, participation in the olive harvest is traditional for entire families from villages, towns, and even cities. It is a great mobilization of labor to harvest the second-largest crop in Greece, in which a large proportion of the people have some direct ownership interest. But problems are becoming evident even here. In 1965, the Ministry of Labor hired and transported workers from one region to another to harvest the large olive crop.

### Productivity

The relatively low productivity of the agricultural population is illustrated by per capita shares of gross domestic product (GDP) that accrued within and outside the agricultural sector (fig. 9).

Per capita GDP was determined by dividing GDP, expressed in constant 1958 dollars, by population. Growth occurred at a rate of 5.1 percent annually over the 19-year period, and attained a level of almost \$538 by 1967. In 1967 dollars, per capita GDP in 1948 was about \$251, and \$683 by 1967. At this rate of growth, Greece was rapidly approaching the level of \$1,000 per capita GDP.

Per capita gross agricultural product (GAP) is GAP divided by the number of people in agriculture. It is very low compared with average per capita GDP. The growth rate of 4.1 percent is from a low base; hence, after the level almost doubled over the period, the end result was still low. This picture is in marked contrast with the implied productivity outside agriculture. Its growth rate of 4.2 percent is similar to that in agriculture, but this growth began from a large base; thus, absolute gains are very large.

GAP is the part of GDP originating in agriculture. Like GDP, GAP is a value added concept; in effect, it is the total value of agricultural output, as reported in chapter I, minus two major items -- (1) inputs originating outside the sector, such as fertilizer and other purchased inputs; and (2) farm products used in further production, the most important of which is farm-produced feeds fed on farms -- and a number of minor items.

Comparison over time, from 1948 to 1967, of the total value of agricultural commodities produced and GAP shows that total value was less than 10 percent more than value added in the early years; by 1960, it approached 20 percent more; and in 1967, it was 29.5 percent more. (From 1948 to 1951, the differences as reported were very irregular). The increasing divergence of these two series is consistent with changes that include increased use of fertilizers, mechanization, and the large part of the growth in livestock output that is attributed to increased feeding of farm-produced feeds and imported feeds and supplements. The diverging pattern is also the reason for the difference between the 5.0-percent annual growth of total agricultural output, 1948-50 to 1965-67, and the 4.1 percent rate for value added.

Underemployment and unemployment are associated with the population in agriculture that is excessive in relation to resources. Actual unemployment is, in fact, low. One source reported only about 36,000 unemployed in the 1961 census, while about 600,000 of those active in agriculture were underemployed (43). In the towns, 230,000 were classified as unemployed. Most people in agriculture are members of a farm family; if able, they take part in the farmwork and are thus active in agriculture. Underemployment is largely seasonal; that is, at times, all are fully employed, and at times

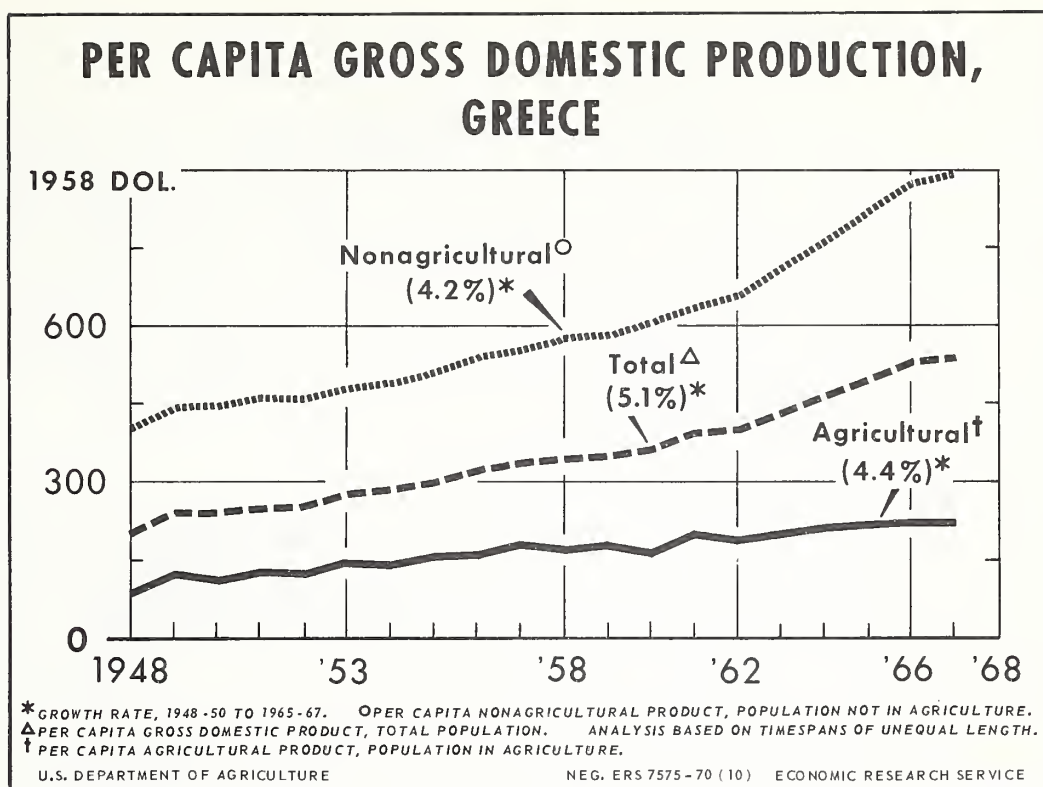


Figure 9

there may be little for anyone to do. The actual number of those active should be deflated considerably to arrive at the true labor input.

A study of farms in western Macedonia showed how farm family income varied, per family member and per stremma farmed, as farm and family sizes varied (9). The results indicated that average-sized and capitalized farms in the area -- that is, farms of almost 35 stremmas -- could be optimally operated without the labor of the son and without adding any labor-saving investment to substitute for his labor. Thus, underemployment would have existed on an efficiently operated farm having only average supplies of land and capital for the area.

Besides underemployment, productivity of the work done may be very low. In 1961, of the 1,966,000 active in agriculture, 777,000 were females, and 647,000 were listed as unpaid family workers. Abundance of labor, particularly unpaid family labor, left little incentive to save labor. Therefore, the farm organization would have tended to include labor-consuming enterprises, and the ways of performing individual tasks would emphasize use of labor rather than even simple capital inputs to replace or reduce it.

### Capital

Capital is a complex concept. To the farmer, it represents access to or control of the means of production. In aggregate analysis, the point of actual ownership is much less important than the amount that is committed to the sector. When allocated in organizing a farm, or an aggregate of farms, capital in agriculture emerges in two forms, fixed and variable. The latter can also be called working or operating capital.

## Fixed Capital

The National Accounts of Greece provide information on what changes have been taking place in the supply of fixed capital. The item is termed "gross fixed-asset formation" in agriculture. The U.N. has developed a definition that can be assumed to agree with that used in the Greek national accounts, at least within narrow limits. In brief, gross fixed-asset formation includes "the purchases and own-account construction of fixed assets . . . by enterprises, private non-profit institutions in their capacity as landlords and general government." Fixed assets generally include "all durable producers goods with an expected lifetime of more than one year, which accordingly are not written off in the year they are purchased . . ." (71, pp. 28-29). Some explicit items are land acquisition and reclamation, farm buildings, roads, utilities, transport, and agricultural machinery, and, by implication, breeding stock. The data are not adjusted for changes in stocks.

Overall growth rate in increments to investment in agriculture was 9.7 percent from 1948 to 1967 (fig. 10). Public investment is shown separately from private investment in the figure (the U.N. includes in private investment that made on private account whether or not supported by loans from the general government). After an initial sharp rise dominated by public investment, the total and Government annual investments fell to relatively low levels, until rapid growth began in 1956. Private investment increased very rapidly, with one interruption, in 1962. Annual public investment declined sharply toward the end of the period. Thus, in recent years, private investment was the dominant source for capital in the agricultural sector.

A large proportion of private investment in land is probably labor input of farmers rather than investment of surplus earnings. Coutsamaris indicates this was the case when cropland area was doubled through clearing, draining, irrigation, and the like, in the 20 years before World War II (3). On the other hand, public investment would be primarily transfers through monetary media, including, among other items, both project development, such as water storage, diversions, and primary distribution, and supplementary subsidy of farmer investment in wells and other land development.

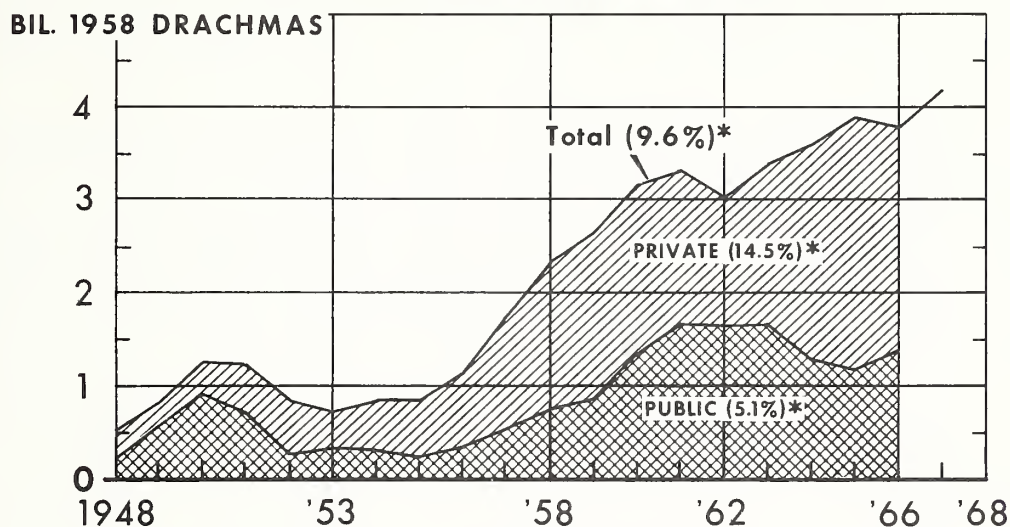
In recent years, total gross fixed-asset formation in Greece increased rapidly, growing at the annual rate of 8.4 percent from 1958-60 to 1964-66 (table 14). Rate of growth in agriculture was slower, with the proportion in agriculture declining from 12.6 percent to 10.9 percent, while the GAP proportion of GNP declined from 26.8 percent to 23.3 percent. The proportion of public investment remained fairly constant, while the proportion of total public investment in the agricultural sector declined, after a sharp rise in 1961-63. A significant feature is the very marked shift in emphasis in public investment in agriculture toward land improvement, a fixed asset that rose to over 60 percent in 1964-66.

## Productivity of Fixed Capital

Aside from land, major fixed investments on farms are machinery, trees, and livestock herds. Besides these, several minor categories are important in total, but data are not available for analysis.

Among machinery items, the symbol of mechanization is tractor power. War losses, together with obsolescence and the lack of spare parts, resulted in a greatly reduced number of tractors in 1945 compared with 1940 (19). However, by 1947, foreign aid had more than made up wartime losses. By 1950, with American assistance, Greece had increased her tractor force to approximately three times prewar estimates.

# GROSS FIXED-ASSET FORMATION IN AGRICULTURE, GREECE



\*GROWTH RATE, 1948-50 TO 1964-66.

ANALYSIS BASED ON TIMESPANS OF UNEQUAL LENGTH.

U.S. DEPARTMENT OF AGRICULTURE

NEG. ERS 7577-70 (10) ECONOMIC RESEARCH SERVICE

Figure 10

Table 14.--Distribution and rates of change of gross fixed-asset formation,  
by source and sector, selected periods

| (1958 drachmas)              |         |                                      |         |         |   |
|------------------------------|---------|--------------------------------------|---------|---------|---|
| Source and sector            | Unit    | Average investment,<br>3-year period |         |         | Rate of<br>change,<br>1958-60 to<br>1964-66 |
|                              |         | 1958-60                              | 1961-63 | 1964-66 |   |
|                              |         |                                      |         |         | Pct.  |
| All sources:                 |         |                                      |         |         |   |
| All sectors .....            | Mil. dr | 21,631                               | 25,409  | 35,187  | 8.4   |
| Agricultural sector .....    | do.     | 2,728                                | 3,278   | 3,833   | 5.8   |
| Percentage of all sectors .. | Pct.    | 12.6                                 | 12.9    | 10.9    | -2.4  |
| Public sources:              |         |                                      |         |         |   |
| All sectors .....            | Mil. dr | 5,185                                | 7,207   | 8,442   | 8.5   |
| Percentage of all sources .. | Pct.    | 24.0                                 | 28.4    | 24.0    | 0.0   |
| Agricultural sector .....    | Mil. dr | 1,010                                | 1,671   | 1,331   | 4.7   |
| Percentage, all sectors ..   | Pct.    | 19.5                                 | 23.2    | 15.8    | -3.4  |
| Land improvement .....       | Mil. dr | 379                                  | 8826    | 802     | 13.3  |
| Percentage, agricul-         |         |                                      |         |         |   |
| tural sector .....           | Pct.    | 37.5                                 | 49.5    | 60.3    | 8.2   |

Source: (44 and 45).



Large wheel tractors and garden tractors are significant in terms of farm power, while crawler types, small in number, are almost a kind of infrastructure, governmentally or privately owned and available in most areas for major land improvement or other operations requiring once-over use (table 15). From 1947 to 1966, both wheel and garden tractors increased in number at extremely high annual rates -- 18.1 and 28.7 percent, respectively. These rates are well in excess of growth rates for any other inputs.

Table 15.--Number of tractors and combines used in agriculture, 1947-66

| Year       | Large tractors     |                     |                 | Garden<br>tractors <sup>1/</sup> | Combines |
|------------|--------------------|---------------------|-----------------|----------------------------------|----------|
|            | Crawlers           | Wheel <sup>1/</sup> | Total           |                                  |          |
|            | ----- Number ----- |                     |                 |                                  |          |
| 1947 ..... | 415                | 1,861               | 2,276           | NA                               | NA       |
| 1948 ..... | 628                | 2,241               | 2,869           | NA                               | NA       |
| 1949 ..... | NA                 | NA                  | NA              | 300                              | 250      |
| 1950 ..... | NA                 | NA                  | <u>2/</u> 5,000 | 400                              | 400      |
| 1951 ..... | NA                 | NA                  | NA              | 500                              | 500      |
| 1952 ..... | <u>3/</u> 550      | 5,500               | 6,050           | 800                              | 600      |
| 1953 ..... | <u>3/</u> 600      | 5,830               | 6,430           | 1,000                            | 700      |
| 1954 ..... | <u>3/</u> 730      | 7,800               | 8,530           | 1,000                            | 700      |
| 1955 ..... | <u>3/</u> 750      | 8,250               | 9,000           | 1,200                            | 750      |
| 1956 ..... | <u>3/</u> 800      | 9,000               | 9,800           | 1,500                            | 890      |
| 1957 ..... | 660                | 13,300              | 13,960          | 2,000                            | 945      |
| 1958 ..... | 681                | 16,975              | 17,656          | 2,500                            | 1,205    |
| 1959 ..... | 700                | 18,800              | 19,500          | 6,000                            | 1,640    |
| 1960 ..... | 720                | 20,600              | 21,320          | 7,000                            | 1,870    |
| 1961 ..... | 730                | 21,900              | 22,630          | 8,000                            | 2,030    |
| 1962 ..... | 730                | 23,800              | 24,530          | 9,000                            | 2,150    |
| 1963 ..... | 750                | 27,750              | 28,500          | 10,500                           | 2,180    |
| 1964 ..... | 800                | 32,700              | 33,500          | 13,731                           | 2,764    |
| 1965 ..... | 850                | 38,561              | 39,411          | 17,500                           | 3,935    |
| 1966 ..... | 900                | 44,100              | 45,000          | 22,000                           | 4,118    |

<sup>1/</sup> Wheel tractors generally have 3 or 4 wheels and engines of 8 horsepower and over. Garden tractors develop less than 8 horsepower and have 1 axle.

<sup>2/</sup> Estimate.

<sup>3/</sup> Government-owned only.

Note: NA means not available.

Source: Compiled from (38).

In 1966, Greece had about 1,234,000 farms. This means there is still less than one tractor (wheel or garden) per 20 farms -- mechanization has only begun. However, given the recent rate of growth in number of tractors, farms that can both use mechanical power and support its cost will soon be mechanized. Land resources released from the feedbase for draft animals are rapidly becoming important in their effects on other livestock output.



Wheel tractors provide the power on larger, generally consolidated farms predominantly in the plains areas. While not large of their kind, they meet the needs for farming the heavier soils of these areas, and have the capacity to complete operations in a timely manner. Also, because these are productive lands, farmers can afford to buy such tractors. Whether they can use them enough to justify the investment is another question -- 4, 6, or even 10 hectares cannot fully use such a machine, which has the minimum equipment of at least a plow, disk, seeder, and trailer wagon. On the other hand, the alternative of human and animal power may be even more costly.

On the Thessaloniki plain, a large proportion of the farmers have tractors, which represent far more power than is required for the area. Until very recently, most of the tractor power used was supplied by custom operations, either by the few who owned tractors or the area office of mechanization machinery pool. One major problem was timeliness of operations -- farmers delayed custom work until their own work was done, and the machinery pool also had scheduling problems. These were forces leading to individual ownership of tractors. The tractor has the added value of being a prestige item. And its general utility is also a factor in ownership. Not only is it the source of power, but it is the means of transportation of labor, equipment, and materials between village and land, and farm and market. And, last but not least, it provides family transportation.

Garden tractors are the power units for small farms, less productive and fragmented areas, and rougher lands. Inexpensive, they are available to people with less income and less need for power. In areas of highly fragmented holdings, they can be moved from field to field on relatively narrow access routes. Yet the ingenuity applied in their development has resulted in power units and attachments that can perform most farming operations satisfactorily -- just more slowly and with more labor time than for the wheel tractor. They provide, on a smaller scale, the same transportation facilities.

Tractor use is distributed according to topography. In 1965, 78 percent of the wheel tractors were used in level communes, 17 percent in semimountainous, and only 5 percent in mountainous. Those under 12 horsepower were less restricted -- 57 percent in level communes, 23 percent in semimountainous, and 20 percent in mountainous ones. Distribution of all tractors is reflected in the hectares of cropland per tractor according to topography (57):

|                                | <u>Hectares</u> |
|--------------------------------|-----------------|
| Level communes .....           | 61              |
| Semimountainous communes ..... | 93              |
| Mountainous communes .....     | 140             |
| All communes .....             | 75              |

The density of mechanical power in relation to cultivated area is inverse to the corresponding density of the 1961 rural population (significant at the .001 level). That is, in those areas with larger farms, substitution of mechanical power for labor and animals has been profitable. Even by 1957, tractor use in numbers, and further weighted by the number of larger tractors, was becoming concentrated in Macedonia, Thessaly, and Central Greece -- areas where the incidence of level communes is high. Generally, regions with concentration of tractors had high rates of growth in output -- regional growth rates, 1954-56 to 1965-67, were inversely related to crop area per tractor (.05 level of significance). This inverse relation was stronger between regional growth rates and arable land per tractor of 12 horsepower and over (.01 level of significance). Conversely, regions with fewer tractors in relation to crop area -- the Aegean Islands and Epirus -- had low growth rates in total agricultural output.

A major exception to these generalizations is the Peloponnesus, with a low rate of growth in output. This area had a relatively high incidence of tractors, but their numbers included a large proportion under 12 horsepower. Another exception is Thrace, among the highest in growth in output with relatively few tractors. One reason for this is that Thrace gained a substantial part of its growth from livestock. Another is that the region has developed a type of semicooperative farming whereby substantial areas of small fragmented farm holdings are pooled for large-scale custom farming. In this way, tractors and other equipment are used efficiently. Productivity of this land gains further because of the uniform application of good technology.

Combines are increasing rapidly in number, as shown in table 15. The total number is relatively insignificant in relation to the area of cereal grains, but the figure indicates trends in mechanization -- in this case, a machine that has specific limitations on use in small fields.

### Trees

Fruit trees are fixed investment in that their productive life extends over a span of years. Output from tree crops has grown slowly relative to that for most crop groups. Part of the slow growth is attributable to (1) some kinds of tree crops that are not important commercially and do not get much attention, (2) long-term stability in yields of olives, which includes a large proportion of olive trees in unfavorable locations, and (3) the lag between planting and full production of important citrus and deciduous fruit trees. In fact, extensive new plantings can lead to lowering of average yield per tree, as with citrus during the 1950's. The effect is the opposite as trees mature, especially if the amount of new planting is low.

### Vines

From an investment point of view, vines are similar to trees. Area and output grew at a very slow annual rate, 1.5 percent from 1947-49 to 1965-67; thus, productivity remained fairly constant.

### Livestock

Investment in breeding animals is fixed capital. Numbers of these coincide fairly well with December 31 inventories, because, in Greece, animals produced for meat are slaughtered at light weights and early ages. The resulting inventory characteristic contrasts with that in some major meat-producing countries where slaughter cattle are left on extensive ranges 4 or 5 years before slaughtering, and where sheep are kept primarily to produce wool and are slaughtered after several years.

Cattle led all major commodity groups in growth of value of output, at 9.9 percent per year, shown in the index of output in figure 11. The number on farms increased at a slow rate; thus, most of the increase was in productivity, and it has several components.

Until about 1957, cattle numbers were being rebuilt to about prewar levels. Female animals withheld from slaughter did not show up as output of meat, and those kept for milk production did not contribute to output until they were 2 or 3 years old. After herds were rebuilt, a larger proportion of animals born were destined for slaughter, and the lag in milk production stabilized.

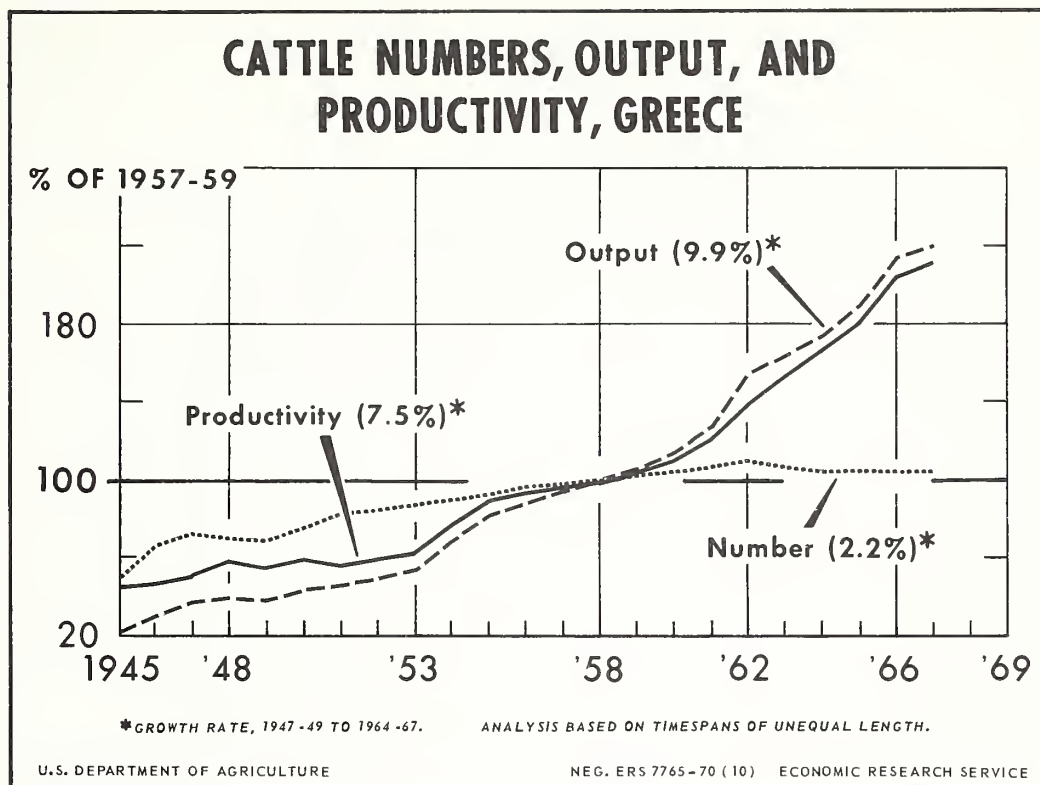


Figure 11

Growing emphasis on dairying increased output per animal markedly -- not only are calves produced for slaughter at about the same rate, but the cow is raised to maturity, produces milk for several years, and is then slaughtered. In this connection, quality of stock has been improved at a rapid rate by introducing improved bloodlines to mix with indigenous types, which increases potential for producing both meat and milk.

Traditionally, cattle were slaughtered at light weights to supply the demand for veal; fat, mature beef is not liked. Deliberate efforts were made to induce farmers to keep animals to older ages and add some fat, but the resulting animals have not gained market acceptance. Even so, farmers are feeding stock better, using more grains, supplements, and forages; increasing milk output; and attaining faster growth rates. These improvements were originally stimulated by importation and wide distribution of feed grains under PL 480; the Government sold them to farmers at favorable prices. After the benefits were demonstrated, farmers continued to feed well, using home-grown grains and purchased grains and supplements.

Cattle for power are being replaced by tractors. Output of animals that were kept for this purpose was not included in the data. In the mechanization process, however, resources used to support draft animals are thus released for production of meat and milk.

Output from sheep grew at the slowest rate of the livestock groups, 4.4 percent per year (fig. 12). The pattern here is similar to that of cattle -- slow growth in numbers, most of the growth in output due to productivity, but slower growth rates. Numbers of sheep on farms declined sharply from 1962 to 1967. Sheep went through the

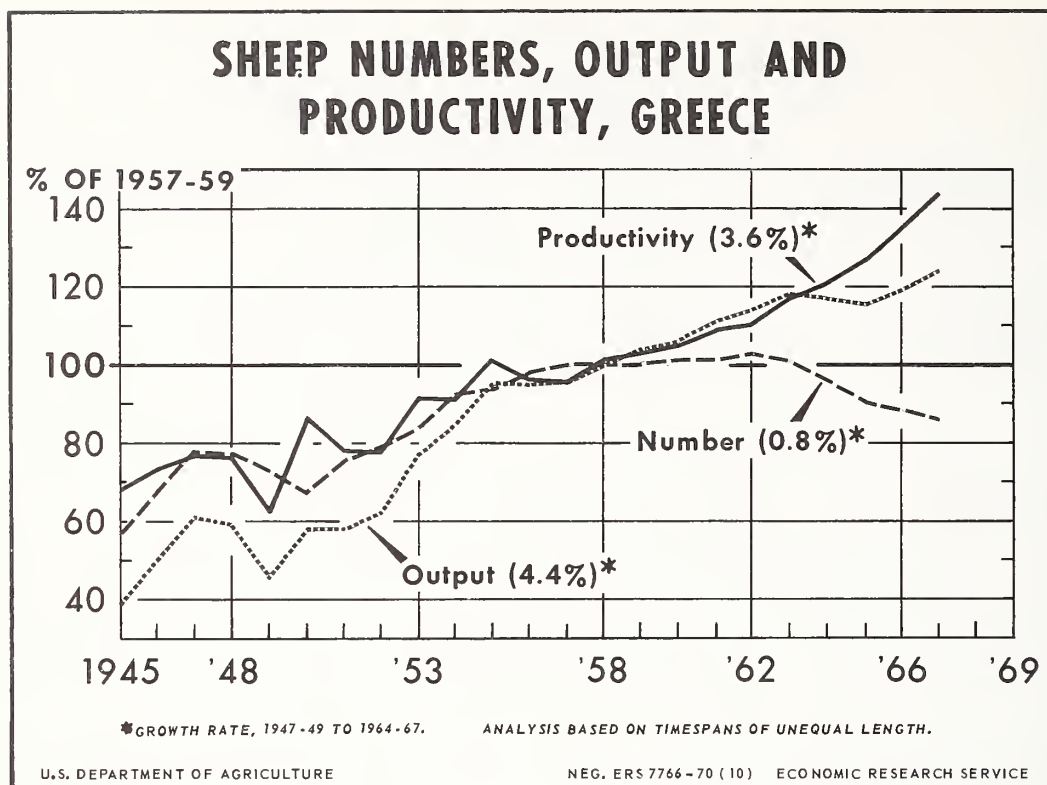


Figure 12

same process of herd restoration, but beyond that, increased productivity must be attributed largely to better feeding and care. No suitable source of improved stock was available. Output and productivity of goats showed a pattern similar to that of sheep.

### Seed, Fertilizers, and Pesticides

These three items are the major annual production inputs -- representing operating capital -- for which data are available (table 16). While very important items in real cost, forage and feed for work animals are mostly homegrown. Other items that are increasing in use very rapidly are fuel for tractors and other power units, and electricity used for pumping irrigation water and for other farm and village purposes.

Seeds are for the most part home produced. Estimates of their value enter the accounts as part of the process of allocating total agricultural output. At constant prices, the value used increased at a very low rate. Three primary factors are involved in the growth that did occur -- increases in land area to be planted; changes in crop composition, which would change the value of seed required per unit of area; and prices of seeds of new and improved varieties in relation to the value of common seed saved from farm production. Seeds of new varieties are potentially very important in their effects on productivity because new varieties are introduced in this way, although the amount bought relative to the total value of seeds used is likely to be small in any one year.

Fertilizers can be most directly associated with increases in output. Their use in value terms grew at the very high annual rate of 13.7 percent from 1948-50 to



Table 16.--Values and growth rates of seed, fertilizer, and pesticides used, 1948-66

| Year                                     | Seeds     | Fertilizer          | Pesticides |
|--|-----------|---------------------|------------|
|  |           | 1,000 1958 drachmas |            |
| 1948 .....                               | 766,088   | 189,000             | 34,200     |
| 1949 .....                               | 758,080   | 203,000             | 47,155     |
| 1950 .....                               | 833,515   | 272,000             | 63,219     |
| 1951 .....                               | 864,730   | 366,000             | 65,360     |
| 1952 .....                               | 898,948   | 361,000             | 68,948     |
| 1953 .....                               | 937,103   | 414,000             | 84,197     |
| 1954 .....                               | 914,591   | 597,000             | 93,084     |
| 1955 .....                               | 952,252   | 679,000             | 91,378     |
| 1956 .....                               | 965,493   | 626,284             | 87,096     |
| 1957 .....                               | 984,105   | 783,138             | 96,433     |
| 1958 .....                               | 1,021,624 | 862,550             | 127,529    |
| 1959 .....                               | 1,044,918 | 889,093             | 136,747    |
| 1960 .....                               | 1,059,621 | 982,211             | 150,549    |
| 1961 .....                               | 1,063,380 | 1,058,558           | 251,925    |
| 1962 .....                               | 1,099,144 | 1,161,026           | 314,399    |
| 1963 .....                               | 1,058,489 | 1,370,417           | 270,945    |
| 1964 .....                               | 1,097,020 | 1,539,405           | 243,813    |
| 1965 .....                               | 1,159,471 | 1,765,861           | 236,057    |
| 1966 <sup>1/</sup> .....                 | 1,162,340 | 1,858,000           | 224,514    |
|  |           | Percent             |            |
| Rate of growth,<br>1948-50 to 1964-66 .. | 2.4       | 13.7                | 10.4       |

<sup>1/</sup> Preliminary.

Source: (44, 45, and 46).

1964-66. The growth rate of 12.3 percent in tonnage of nutrients was almost as rapid as that in value (table 17). The difference arose from such possibilities as time period difference, increase in fertilizer prices relative to other components of the deflator, and changes in relative composition toward higher priced nutrients. Use of nitrogen has increased the most rapidly, though not much more so than that of phosphate, but use of both has increased more rapidly than that of potash.

The proportionate composition of average nutrients used, expressed in terms familiar in the fertilizer trade, was about 16-12-2 in 1965-67. Use of nitrogen was predominant in the mix, and use of potash, limited. The former is consistent with the cropping pattern. The latter may indicate a limited response to potash, a price factor, or official resistance to importing this component, which is not produced domestically.

Nutrients used per hectare of cropland increased from 12.64 kilograms for 1947-49 crops to 65.66 for 1965-67. It is estimated that two-thirds of the cultivated land was fertilized in 1967, about one-sixth in 1950, and only one-tenth before World War II (54 and 56).



Table 17.--Annual consumption of fertilizer nutrients, 1938 and 1947-67

| Year                 | Consumption                |                                  |                       |       |
|----------------------|----------------------------|----------------------------------|-----------------------|-------|
|                      | Nitrogenous<br>fertilizers | Phosphatic<br>fertilizers        | Potash<br>fertilizers | Total |
|                      | (N) <u>1/</u>              | (P <sub>2</sub> O <sub>5</sub> ) | (K <sub>2</sub> O)    |       |
|                      | <u>1,000 metric tons</u>   |                                  |                       |       |
| 1938 .....           | 8.6                        | 7.7                              | 4.3                   | 20.6  |
| 1947 .....           | 10.3                       | 12.0                             | 3.0                   | 25.3  |
| 1948 .....           | 16.0                       | 10.9                             | 3.0                   | 29.9  |
| 1949 .....           | 19.6                       | 14.5                             | 4.0                   | 38.1  |
| 1950 <u>2/</u> ..... | 25.0                       | 25.0                             | 5.0                   | 55.0  |
| 1951 .....           | <u>2/</u> 22.0             | 19.0                             | 10.0                  | 51.0  |
| 1952 .....           | 30.1                       | 23.3                             | 4.5                   | 57.9  |
| 1953 .....           | 28.1                       | 23.1                             | 3.3                   | 54.5  |
| 1954 .....           | 37.3                       | 32.3                             | 3.3                   | 72.9  |
| 1955 .....           | 43.8                       | 40.1                             | 4.4                   | 88.3  |
| 1956 .....           | 41.6                       | 30.6                             | 3.8                   | 76.0  |
| 1957 .....           | 55.9                       | 41.8                             | 7.6                   | 105.3 |
| 1958 .....           | 62.6                       | 48.8                             | 7.1                   | 118.5 |
| 1959 .....           | 70.8                       | 54.6                             | 8.5                   | 133.9 |
| 1960 .....           | 69.5                       | 52.2                             | 7.1                   | 128.8 |
| 1961 .....           | 73.1                       | 58.6                             | 9.0                   | 140.7 |
| 1962 .....           | 83.3                       | 65.6                             | 9.8                   | 158.7 |
| 1963 .....           | 96.7                       | 84.3                             | 17.1                  | 198.1 |
| 1964 .....           | 115.9                      | 87.7                             | 15.0                  | 218.6 |
| 1965 .....           | 131.1                      | 100.6                            | 14.8                  | 246.5 |
| 1966 .....           | 133.9                      | 101.8                            | 15.0                  | 250.7 |
| 1967 .....           | 145.1                      | 101.4                            | 15.1                  | 261.6 |
|                      | <u>Percent</u>             |                                  |                       |       |
| Rate of growth       |                            |                                  |                       |       |
| 1947-49 to           |                            |                                  |                       |       |
| 1965-67              | 12.9                       | 12.3                             | 8.7                   | 12.3  |

1/ Fertilizer distributed July 1 of preceding year through June 30 of designated year, for crop of designated year.

2/ "Unofficial figure."

Source: Compiled from (38). (Data for 1963 through 1967 agree very closely with data provided by the Agricultural Bank.)

Regression analysis shows that for 1952-54 to 1965-67, regional rates of growth in use of fertilizer nutrients were closely related to rates of increase in crop output (significant at the .01 level) (table 18). For the period beginning with 1954, when regional livestock data became available and provided the basis for total regional output analysis, regressions of (1) total regional output with growth in use of fertilizer nutrients and (2) increases in regional output with nutrient per stremma of cultivated area in 1966 were both significant at the .05 level. As would be expected, fertilizer use relates more closely to crop output than to crop and livestock output.

This analysis does not imply that increased output is attributable to fertilizer alone, although some large part of it is. It does suggest, perhaps, a package approach to advancing technology that includes a large measure of fertilizer.

Pesticides, the third input shown in table 18, have been growing rapidly in values used. However, the total, in relation to fertilizers, is not large enough for gross evaluation. Clearly, pesticides are not in general use. A substantial proportion of the total -- in some years, probably 25 to 50 percent -- has been distributed by the National Tobacco Organization, to control pests and improve quality of that one crop.

Table 18.--Regional distribution and rates of use of fertilizer nutrients, 1952-54 and 1965-67

| Region               | Average nutrients used |                    | Growth rate,<br>1952-54 to<br>1965-67 | Average nutrients<br>per stremma,<br>1965-67 |
|----------------------|------------------------|--------------------|---------------------------------------|--|
|                      | 1952-54                | 1965-67            |                                       |  |
|                      | <u>Metric tons</u>     | <u>Metric tons</u> | <u>Percent</u>                        | <u>Kilograms</u>                             |
| Peloponnesus .....   | 18,760                 | 46,474             | 7.2                                   | 6.68   |
| Central Greece ..... | 10,700                 | 33,952             | 9.3                                   | 5.66   |
| Thessaly .....       | 10,893                 | 40,911             | 10.7                                  | 8.36   |
| Epirus .....         | 959                    | 8,283              | 14.0                                  | 4.75   |
| Macedonia .....      | 13,222                 | 77,921             | 14.6                                  | 8.08   |
| Thrace .....         | 1,579                  | 13,866             | 18.1                                  | 5.46   |
| Aegean Islands ..... | 2,008                  | 4,217              | 5.9                                   | 3.80   |
| Cyclades .....       | 899                    | 1,630              | 4.7                                   | 4.90   |
| Crete .....          | 6,648                  | 21,659             | 9.5                                   | 7.77   |
| Ionian Islands ..... | 1,598                  | 4,725              | 8.7                                   | 4.96   |
| Dodecanesos .....    | 605                    | 1,828              | 8.9                                   | 4.88   |
| Total .....          | 68,871                 | 252,465            | 10.6                                  | 6.88   |

Source: (42).

A universal characteristic of developing countries is a high level of economic dependence on the agricultural sector, especially in the early stages, and a declining relative importance of the sector as development advances. At the same time, the agricultural sector depends on the rest of the economy in a variety of ways, many of which increase with development. Some aspects of the interdependence are (1) demands for and supplies of food, fiber, and industrial raw materials; (2) economic relationships; and (3) labor supplies and population flows.

#### Food and Raw Materials

The priority goal set for the agricultural sector of an economy is to meet all the domestic demand for food, fiber, and raw agricultural materials for industry, in quantity and kind. It is almost physically impossible to produce the variety of commodities demanded within the political boundaries of most countries, except in those with the most unsophisticated levels of demand. Even if it were possible, comparative advantages exist among countries in producing various commodities, leading to trade. The priority goal is thus modified, and the agricultural sector should then produce enough of the commodities in which the country has an advantage for exports to equal imports. A secondary objective is to export more than is imported, providing a net source of foreign exchange. A third goal seems inevitable -- expanding domestic production of certain commodities that can be produced at some disadvantage, but whose production conserves foreign exchange.

These concepts are dynamic. Quantity of food demanded increases with both growth of population and income. The kinds demanded change with incomes, and with the movement of population from farms to cities. Quantities and kinds of food needed for export depend on factors external to the economy.

#### Output and Demand

Effective demand for agricultural commodities is met by domestic production plus imports, and if production of some commodities exceeds demand, a balance can be achieved by exporting. If more commodities are exported than imported, then by implication, supply exceeds effective internal demand. This situation prevailed in Greece from 1953 to 1966. Comparable data are not available for earlier years, but under circumstances that prevailed in 1947 and the following few years, Greece no doubt had a net import balance of agricultural products at the beginning of the study period lasting probably until 1951 or 1952.

Import commodities.--These groupings of commodities from trade tabulations under the Standard International Trade Classification (SITC) can be identified in detail through classification numbers and commodity indexes published by the U.N. (table 19) (69). The three categories of animals and meats; dairy products, eggs, and fish; and livestock feeds have increased consistently and rapidly in Greece over the period. Cereals and cereal products, not including barley and maize, which are included in livestock feeds, were fairly substantial at first and have been consistently low since. Effects of the program for domestic sugar production can be seen initially in 1961, and most emphatically in 1965 and 1966. Coffee and cocoa are the major items under beverages and tobacco. Wool and synthetics are the major fiber imports.

Export commodities.--Only three categories have been consistently significant (table 20). The major component of the fruit and vegetable group has been dried fruits;

Table 19.--Imports of agricultural commodities, 1953-66

| Year                                  | : Animals, and meats :<br>1/ | : Dairy, eggs, and fish :<br>2/ | : Live-stock :<br>3/ | : Sub-total :<br>4/ | : Cereals and cereal products :<br>5/ | : Sugar and confect-ions :<br>6/ | : Beverages :<br>7/ | : Animal and vegetable :<br>8/ | : Hides, skins, and fibers :<br>9/ | : Total agricultural commodities :<br>10/ |
|---------------------------------------|------------------------------|---------------------------------|----------------------|---------------------|---------------------------------------|----------------------------------|---------------------|--------------------------------|------------------------------------|---|
| ----- Millions of 1958 drachmas ----- |                              |                                 |                      |                     |                                       |                                  |                     |                                |                                    |   |
| 1953                                  | 355                          | 364                             | 34                   | 753                 | 564                                   | 516                              | 190                 | 181                            | 660                                | 2,989                                     |
| 1954                                  | 321                          | 412                             | 26                   | 759                 | 483                                   | 269                              | 313                 | 105                            | 765                                | 2,805                                     |
| 1955                                  | 294                          | 692                             | 37                   | 1,023               | 935                                   | 275                              | 273                 | 138                            | 730                                | 3,495                                     |
| 1956                                  | 403                          | 758                             | 45                   | 1,206               | 961                                   | 380                              | 242                 | 344                            | 665                                | 3,973                                     |
| 1957                                  | 460                          | 617                             | 136                  | 1,213               | 1,055                                 | 330                              | 261                 | 304                            | 997                                | 4,276                                     |
| 1958                                  | 529                          | 665                             | 224                  | 1,418               | 417                                   | 464                              | 285                 | 183                            | 763                                | 3,655                                     |
| 1959                                  | 525                          | 526                             | 156                  | 1,207               | 286                                   | 388                              | 277                 | 165                            | 548                                | 3,033                                     |
| 1960                                  | 675                          | 472                             | 195                  | 1,342               | 187                                   | 310                              | 257                 | 141                            | 876                                | 3,242                                     |
| 1961                                  | 858                          | 502                             | 299                  | 1,659               | 247                                   | 301                              | 224                 | 308                            | 852                                | 3,697                                     |
| 1962                                  | 731                          | 550                             | 245                  | 1,526               | 116                                   | 222                              | 234                 | 136                            | 813                                | 3,162                                     |
| 1963                                  | 903                          | 618                             | 362                  | 1,883               | 202                                   | 328                              | 265                 | 193                            | 1,007                              | 4,086                                     |
| 1964                                  | 1,007                        | 749                             | 449                  | 2,205               | 203                                   | 426                              | 328                 | 102                            | 1,061                              | 4,493                                     |
| 1965                                  | 1,687                        | 931                             | 447                  | 3,065               | 328                                   | 129                              | 343                 | 383                            | 530                                | 4,961                                     |
| 1966                                  | 1,651                        | 830                             | 755                  | 3,236               | 167                                   | 125                              | 356                 | 148                            | 715                                | 4,935                                     |
| Total                                 | 10,399                       | 8,686                           | 3,410                | 22,495              | 6,151                                 | 4,463                            | 3,848               | 2,831                          | 10,982                             | 52,803                                    |

Standard International Trade Classifications (SITC), as defined in (69). Included in the respective groups are:

1/ 001, 011-13, 291.

2/ 022-25, 029, 031-32.

3/ 043-44, 081.

4/ 041-42, 045-48.

5/ 061-62.

6/ 071-75, 111-12, 121-22.

7/ 091, 221, 411, 421-22, 431.

8/ 211-212, 262-67.

Source: Based on data from (55).



Table 20.--Exports of agricultural commodities, 1953-66 1/

| Year  | Animals and meats | Dairy, eggs, and fish | Sub-total | Cereals and cereal products | Sugar and confect-ions | Fruits and vegetables | Beverages and tobacco | Animal and vegetable oils and fats | Hides, skins, and fibers | Total agricultural commodities |
|-------|-------------------|-----------------------|-----------|-----------------------------|------------------------|-----------------------|-----------------------|------------------------------------|--------------------------|--------------------------------|
|       |                   |                       |           |                             |                        |                       |                       |                                    |                          |                                |
| 1953  | 87                | 2/7                   | 87        | 166                         | 2/1                    | 1,074                 | 1,847                 | 169                                | 334                      | 3,677                          |
| 1954  | 54                |                       | 61        | 1                           |                        | 1,318                 | 2,302                 | 386                                | 400                      | 4,469                          |
| 1955  | 86                | 8                     | 94        | 11                          | 1                      | 1,289                 | 2,659                 | 201                                | 889                      | 5,144                          |
| 1956  | 76                | 19                    | 95        | 2                           | 2                      | 1,320                 | 2,084                 | 165                                | 1,050                    | 4,718                          |
| 1957  | 84                | 26                    | 110       | 3                           | 2                      | 1,679                 | 2,991                 | 294                                | 624                      | 5,703                          |
| 1958  | 81                | 17                    | 98        | 1                           | 7                      | 1,601                 | 3,101                 | 175                                | 979                      | 5,962                          |
| 1959  | 71                | 18                    | 89        | 219                         | 5                      | 1,595                 | 2,129                 | 80                                 | 1,063                    | 5,180                          |
| 1960  | 77                | 30                    | 107       | 4                           | 7                      | 1,450                 | 2,176                 | 134                                | 835                      | 4,713                          |
| 1961  | 72                | 34                    | 106       | 2/2                         | 5                      | 1,533                 | 2,429                 | 10                                 | 1,012                    | 5,095                          |
| 1962  | 88                | 25                    | 113       | 2                           | 7                      | 1,822                 | 2,053                 | 166                                | 1,418                    | 5,581                          |
| 1963  | 61                | 30                    | 91        | 3                           | 11                     | 1,841                 | 3,273                 | 101                                | 1,159                    | 6,479                          |
| 1964  | 89                | 58                    | 147       | 1                           | 11                     | 1,981                 | 3,239                 | 18                                 | 1,172                    | 6,569                          |
| 1965  | 93                | 71                    | 164       | 16                          | 17                     | 2,270                 | 2,981                 | 102                                | 824                      | 6,374                          |
| 1966  | 100               | 65                    | 165       | 800                         | 27                     | 2,261                 | 2,891                 | 154                                | 1,004                    | 7,302                          |
| Total | 1,119             | 408                   | 1,527     | 1,229                       | 103                    | 23,034                | 36,155                | 2,155                              | 12,763                   | 76,966                         |

1/ For SITC classes included in each group, see table 23.  
 2/ Less than .5 million drachmas.

Source: Based on data from (55).

however, fresh fruits have grown to be half as important, and fresh and preserved vegetables are showing very strong growth. Tobacco is practically alone in the next group -- beverages and tobacco. The hides, skins, and fibers group is about two-thirds cotton and one-third hides and skins, with small amounts of wool, animal hair, and textile wastes. At a much lower level were animal and vegetable oils and fats, mostly olive oil; and annual variations in the series reflect the level of the typically erratic olive harvest. Exports of cereals and cereal products were significant in only 3 years.

Data are available for the two major categories of imported inputs, fertilizers and fertilizer materials, and agricultural machinery (table 21). The former represents supplies of fertilizers supplemental to domestic production; the latter represents most of the larger equipment items used, except some garden-type tractors that were being produced locally. The table shows the agricultural commodity balance -- exports in excess of imports of agricultural commodities -- and the net agricultural balance -- exports in excess of commodities, plus agricultural machinery and fertilizer imports reported. Other imported inputs that were significant but not reported separately were fuels and agricultural chemicals, such as pesticides.

Table 21.--Imports of fertilizer and machinery, and net balances, 1953-66

| Year                                  | Fertilizer<br>and<br>materials <u>1/</u> | Agricultural<br>machinery <u>2/</u> | Total<br>inputs | Net commodity<br>balance <u>3/</u> | Net<br>agricultural<br>balance <u>4/</u> |
|---------------------------------------|--|-------------------------------------|-----------------|------------------------------------|--|
| ----- Millions of 1958 drachmas ----- |  |                                     |                 |                                    |  |
| 1953 .....                            | 183                                      | 53                                  | 236             | 688                                | 452                                      |
| 1954 .....                            | 595                                      | 166                                 | 761             | 1,664                              | 903                                      |
| 1955 .....                            | 331                                      | 206                                 | 537             | 1,649                              | 1,112                                    |
| 1956 .....                            | 306                                      | 226                                 | 532             | 745                                | 213                                      |
| 1957 .....                            | 411                                      | 328                                 | 739             | 1,427                              | 688                                      |
| 1958 .....                            | 540                                      | 445                                 | 985             | 2,307                              | 1,322                                    |
| 1959 .....                            | 549                                      | 183                                 | 732             | 2,147                              | 1,415                                    |
| 1960 .....                            | 434                                      | 211                                 | 645             | 1,471                              | 826                                      |
| 1961 .....                            | 412                                      | 188                                 | 600             | 1,398                              | 798                                      |
| 1962 .....                            | 551                                      | 249                                 | 800             | 2,419                              | 1,619                                    |
| 1963 .....                            | 757                                      | 370                                 | 1,127           | 2,393                              | 1,266                                    |
| 1964 .....                            | 580                                      | 566                                 | 1,146           | 2,076                              | 930                                      |
| 1965 .....                            | 613                                      | 717                                 | 1,330           | 1,413                              | 83                                       |
| 1966 .....                            | 475                                      | 585                                 | 1,060           | 2,367                              | 1,307                                    |
| Total .....                           | 6,737                                    | 4,493                               | 11,230          | 24,164                             | 12,934                                   |

1/ SITC groups 271, 561.

2/ SITC group 712.

3/ Total agricultural commodity exports, table 20, minus imports, table 19.

4/ Commodity balance minus inputs.

Source: Based on data from (55).

## Specialization

The import and export patterns demonstrate the effects of specialization. Eight different commodity groups, mostly representing a few individual commodities, were imported in significant volume. The first four supplement domestic production, although in cereals a difference in kind enters -- Greece produces mostly soft wheats; the hard types needed for semolina products must be imported. The domestic beet sugar industry may be a relatively low-cost means of protecting foreign exchange, considering the value of byproducts and the place of sugar beets in land-use rotations. Coffee is not easily adaptable to the Greek climate. Imported fats and oils supplement olive oil, and an unknown proportion of these are for industrial uses, including soaps. Most quality wool must be imported, as well as part of the variety of synthetic fibers required or demanded in a modern economy.

Significant exports occurred in only four groups and represent the few individual commodities in which Greece could specialize because of her particular production resources. At the forefront are dried, deciduous, and citrus fruits, certain vegetables, oriental tobacco, olive oil, and cotton. Some of these had advantages because of geographic and economic proximity to European markets.

## Diet and Quality of Food

Food consumption during 1948-49 to 1950-51 provided only 2,500 calories per day, but intake increased to 2,880 calories by 1954 and 2,990 in 1957. It was 2,960 calories in 1963. From 1948-49 to 1963, meat consumption per capita increased from 11 to 33 kilograms per year. This pattern is in keeping with general growth in agricultural output and GDP per capita and with the recovery of the livestock industry during the 1950's.

Changes in proportionate distribution of expenditure for food among general food categories, proportion of net national income spent for food, and income elasticities of demand demonstrate a classical case of upgrading of diets as per capita incomes increase (table 22). The proportion of food expenditures for cereals and oils and fats decreased steadily, and for cereals, the proportion was more than halved. At the same time, foods of animal origin, including fish, increased -- meat doubled; others increased by about one-half. Fruits and vegetables decreased slightly, which would not be unexpected because expenditures in 1950 at more than 25 percent were already quite high. Beverages, sugar, and confections increased but remained relatively small proportions of food expenditures.

Proportion of income spent on food dropped more than one-fourth during the period. This can best be described in terms of income elasticity of demand for food, the last figure in the table, 0.60. This is less than 1.00 and therefore inelastic, or, the amount that would be spent for food per capita would increase 60 percent of the percentage increase in income per capita. A 10-percent increase in incomes would result in a 6-percent increase in food expenditures. Elasticity of demand for the cereals, fats, and oils group was negative -- a 10-percent increase in incomes would result in an actual decrease of 1.4 percent in expenditures for those foods. On the other hand, income elasticity of demand for animal-derived foods was elastic -- a 10-percent increase in incomes would increase expenditures for this group by 13.3 percent.

These relationships are reflected in foreign trade. Rate of growth of domestic production of cereals caught up with growth in demand for them, and surpluses led to periodic exports. At the same time, imports of supplemental special cereals became fairly stable. The growth trend of olive oil production was slow, and exports varied mostly according to yearly production levels. But livestock production resources were not keeping up with demand increases despite the strong growth shown earlier in this

Table 22.--Composition of food expenditures, income elasticities of demand, and income spent on food, selected years

| Commodity group                                 | Composition of food expenditures |       |       |       |       | Income elasticity of demand<br>1/ |
|---|----------------------------------|-------|-------|-------|-------|-----------------------------------|
|   | 1950                             | 1954  | 1958  | 1962  | 1966  |                                   |
|   | Percent                          |       |       |       |       |                                   |
| Breads and cereals .....                        | 27.6                             | 23.5  | 20.2  | 16.7  | 13.0  | -0.14                             |
| Oils and fats .....                             | 13.0                             | 12.1  | 11.1  | 10.9  | 9.0   |                                   |
| Meat .....                                      | 8.8                              | 10.8  | 13.4  | 16.0  | 19.0  | 1.33                              |
| Fish .....                                      | 4.9                              | 4.2   | 5.2   | 6.4   | 6.6   |                                   |
| Milk, cheese, and eggs .....                    | 12.0                             | 13.3  | 15.5  | 17.0  | 18.3  |                                   |
| Fruits and vegetables .....                     | 26.5                             | 28.7  | 26.5  | 24.3  | 25.3  | 0.43                              |
| Beverages 2/ .....                              | 1.4                              | 1.4   | 1.5   | 1.8   | 1.9   | 1.10                              |
| Sugar and confectionery .....                   | 5.1                              | 5.2   | 5.8   | 6.2   | 6.2   | .98                               |
| Other food .....                                | 0.7                              | 0.8   | 0.8   | 0.7   | 0.7   | .57                               |
| Total food .....                                | 100.0                            | 100.0 | 100.0 | 100.0 | 100.0 | 0.60                              |
| Food as proportion of net national income ..... | 46.0                             | 43.1  | 39.5  | 36.6  | 33.2  | ---                               |

1/ Calculated from annual data.

2/ Coffee, tea, cocoa, and other.

Source: Computed from data in (44) and (45).

report; thus, imports of animal-derived foods themselves and of livestock feed grew rapidly. With relatively limited growth in domestic demand for fruits and vegetables, the increasing output of these products was available to meet the strong export demand.

### Economic Relationships

Intersectoral financial relationships have four major aspects -- output, transfers and investment, exports and foreign exchange, and markets.

### Output

Growth of the Greek economy has followed the expected pattern of a decline in the importance of agriculture in relation to the rest of the economy. Value added in the sector, GAP, increased from 1948-50 to 1965-67 at an annual rate of 4.1 percent, while GDP grew 6.0 percent a year (fig. 13). Industrial growth, as represented by manufacturing, started from a small base and grew at a rate of 8.8 percent. "All other" includes about 10 other groups, none equaling as much as 10 percent of total GDP. The more important of these groups are wholesale and retail trade, public administration and defense, transportation, and construction. In 1948, the agricultural sector generated 28.7 percent of total GDP and manufacturing, 10.8 percent; by 1967, these were 22 and 18.6 percent, respectively. The total for all other sources remained at about 60 percent.



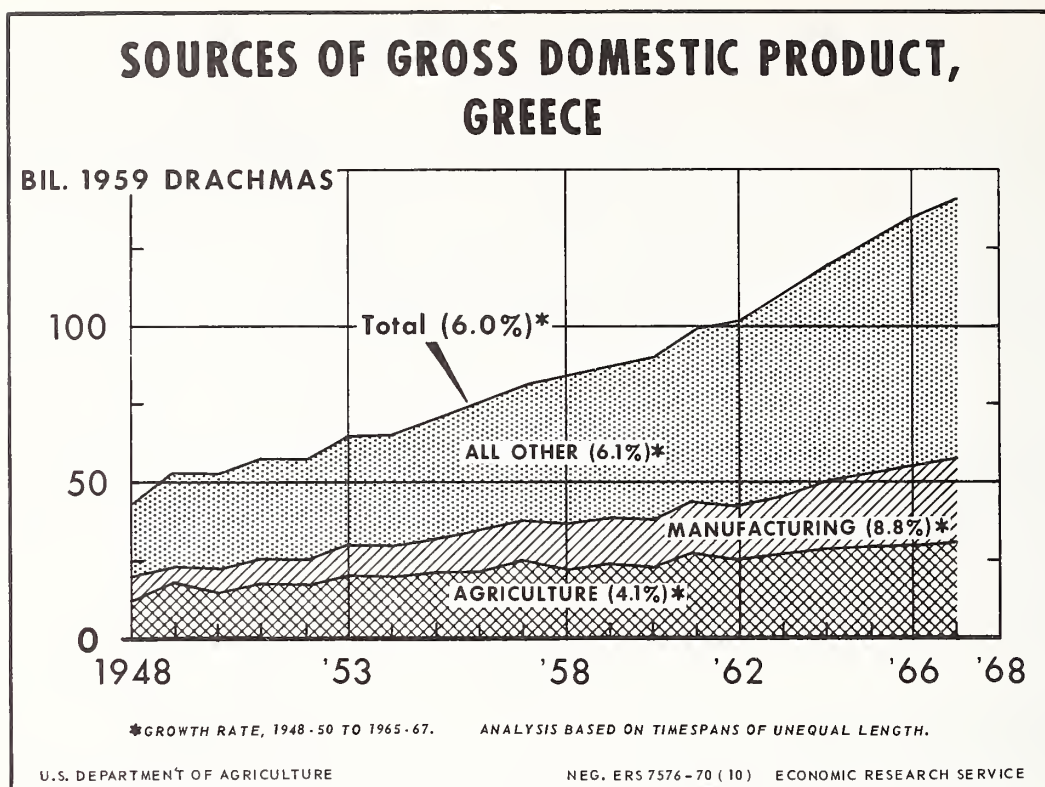


Figure 13

### Transfers and Investment

As mentioned elsewhere in this report, strong public support was given to investment in agriculture in 1948, but it declined relative to private investment almost constantly until 1966 (fig. 10). By 1964-66, the proportion of public investment in agriculture was 15.8 percent, while agriculture contributed 23 percent of the GDP (table 14). Average distribution in 1948-50 was 67.6 percent invested in agriculture.

The other side of this transaction was not clearly reported -- the amount of revenue that the agricultural sector directly supplied general government. Greece had no tax on agricultural land -- one of the most common means of taxing the agricultural sector. The largest single source of Government revenue given in the National Accounts is "indirect taxes," the incidence of which varies by the degree that people participate in the general economy -- which is low in agriculture. The major direct tax on households is social security, and information on the amount imposed on farmers is not available. However, it is likely to be minor. In 1958, a commercial tax of 3 percent was imposed on the value of all agricultural commodities sold.

The result has been a heavy, but relatively declining, net transfer of capital to investment in agriculture. The incidence of the costs and benefits of internal transfers are adjusted among sectors, or enterprises, according to national policy and sectoral needs. Public support of investment in transportation and communication, utilities, and dwellings has been significant -- in most years public investment in each has exceeded that for agriculture, except for utilities before 1952. However, all these activities contribute, in varying degrees, to the growth and development of the agricultural sector.

The rise in public investment in the mid-1950's was an important factor in sustaining the economy during that period. From 1950 to 1962, public investment averaged 36 percent of total investment and was used primarily for electricity, transportation, and land reclamation. With the increasing rate of private savings, the volume of public investment had no adverse effect on monetary stability (67). The marginal propensity to consume declined after 1953 -- the converse, the marginal propensity to save, was reported in 1964 to have reached the level of 20 percent, which is high by any standard and an essential ingredient of self-sustaining economic growth (6). During the period 1949-51 to 1964-66, the implicit deflator of the National Accounts indicates that prices increased at an average annual rate of 5.5 percent.

During the period 1950-51 to 1960-61, the rate of fixed investment accelerated from 16.5 to 19.3 percent of gross national income (21). However, the structure of investment emphasized nonindustrial construction too much to maximize economic development. The decline in investment in manufacturing from 19.5 percent of the total in 1950-52 to 10.0 percent in 1959-62, was a symptom of relative weakness in the industrial development that was needed to avoid stagnation of domestic demand for agricultural products.

### Exports and Foreign Exchange

The outstanding characteristic of Greek trade is the high rate of growth and total volume attained by imports (fig. 14). Agricultural imports -- made up of commodities of agricultural origin, but omitting a few minor items -- increased at a much slower rate and made up a small proportion of the total.

Total exports increased much more slowly than imports, with a constantly increasing unfavorable balance of trade. Exports in proportion to imports declined from 47.5 to

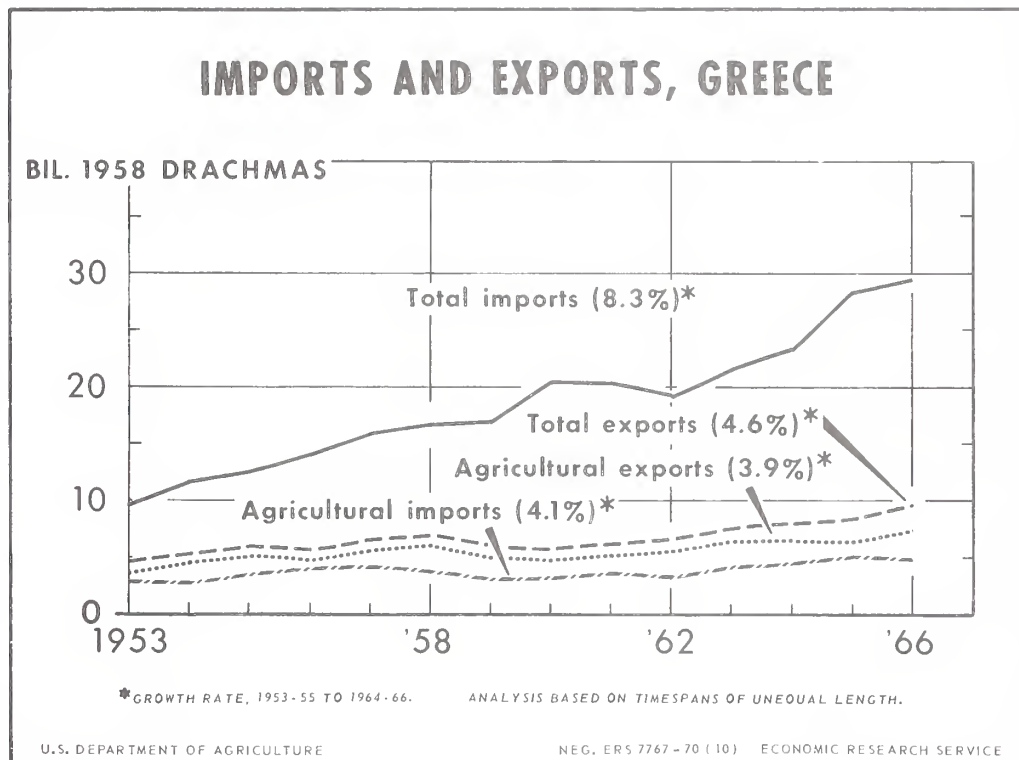


Figure 14

33.2 percent, and were even lower in some years. Agricultural commodities made up most of the exports, but the proportion decreased slightly. These commodities accounted for about 80 percent of exports in 1953 and then declined to about 73 percent; they accounted for about 30 percent of imports in 1953 and then declined to about 17 percent. The agricultural sector is performing rather well in relation to the rest of the economy, with export earnings that offset costs of imports; and it is providing most of the agricultural commodities consumed. This sector requires imports of several inputs -- fertilizer, pesticides, machinery, fuel, and livestock feed. Complete data on these are not available, but evidence indicates that they were less than 5 percent of total imports.

Trade is only part of international transactions. Besides exports, major sources of income to Greece include transportation and other services, tourism, income payments as profits or wages, current transfers to households (remittances), and capital transfers of various kinds including grants and reparations. Major expenditures in addition to imports were for transportation and other services, reverse tourism, and income payments as profits and wages (tourism and income-payment expenditures were small compared with income from those sources). From 1948 to 1967, the balance was unfavorable except for small positive balances in 1951 and 1955, and net borrowing was necessary. The highest balance from 1948 to 1967 was in 1965 -- 11.6 billion drachmas, almost \$400 million -- while the lowest balance after 1956 was in 1963 -- almost 1.5 billion drachmas, or \$50 million.

### Markets

Development and economic growth depend on increasing exchange between the agricultural sector and the rest of the economy of agricultural products and industrial products and services. This interdependence is especially critical in small countries such as Greece. Domestic industry is oriented to a potential domestic market of some 8.7 million people, which imposes a limit on the development of heavy industry. Where the line is drawn depends on the degree of participation by the population in the market economy. Export potential is also important, although the commercial alliance with industrially mature northern Europe, including the EEC, tends to leave Greece at a disadvantage.

The agricultural sector includes over one-half of the total population, as we have seen in chapter III, and, in terms of numbers, half the potential market. The proportionately low per capita income and slow growth are evidence that the sector is not developing its share of market potential.

The overwhelming prevalence of small farms assures a broad distribution of income and of whatever benefits of national growth are accruing to agriculture. However, distribution of income among farmers is not uniform. Throughout agriculture, and with concentration in some regions and local areas, many farm families live near the subsistence level and are not much involved in the commercial sector. Others, having the larger of the small holdings and the more productive resources, and living in the rapidly growing areas, have more surplus to market and are closer to markets; these farmers tend to specialize in commercial crops. These people use more purchased inputs per unit of output and buy tractors, irrigation equipment, and larger items of durable consumer goods. This situation points up the economic need to relieve population pressure on the land, and to provide increased opportunities for remaining farm people to participate in the commercial sector and share more fully in the benefits of growth.

The urban sector presents a more favorable economic situation. Per capita incomes are growing rapidly. In total, growing nonfarm productivity is reflected not only in increasing demand for agricultural products, but in the changing composition of such demand. This change appears most notably in growing demand for animal-derived foods.



However, the absolute disparity of income is much greater than in agriculture, and a large proportion of the urban people are economically no better off than subsistence farmers are. That is, while the urban poor are dependent on the commercial sector, they can buy no more than minimum essential food, housing, and clothing.

The nonagricultural sector needs to absorb surplus people from agriculture faster than it has. A reduction in the farm population of 50 percent would permit some abandonment of unproductive and remote farming land, increased efficiency in the more favorable sites, and an increase in the economic orientation of remaining farm people, but such a reduction would still be far from optimal adjustment. About a 50-percent increase in employment in industry, commerce, and services would be required. Inevitably, this will be a slow process.

### Labor Supplies and Population Flows

Typically, in developing countries, the manpower need in the growing nonfarm sector is in large part supplied through rural-urban migration. This takes place spontaneously -- if opportunities exist, they will be exploited. Commonly, the tendency is overmigration relative to the number of opportunities, resulting in urban slums and a reservoir of unemployed or underemployed workers in the cities. This has occurred in Greece.

The fairly high rate of literacy and related effective communication make the people unusually aware of opportunities elsewhere, and the Greek people are extremely mobile, not only within the country, but internationally.

### Migration From Farms

Population shifts between 1945 and 1965 reduced the proportion of people in agriculture from 63.1 to 53.7 percent. This reduction is reported to have amounted to about 100,000 people annually during 1960-65 (63). It more than offset gains from births and return movements; thus, the rural population showed a modest net decline. The main sources of migrants were Epirus, Macedonia, and Thrace, from the tobacco, former cotton, and mountainous livestock areas.

### Destination

According to the W.A. Lewis model of development, labor migrating out of agriculture has been drawn at relatively low wage rates into the market or capitalistic economy, and profits realized on the use of this labor have been a source of growth capital (13). This undoubtedly happened in Greece. But the mobility of the Greeks admits the attraction of strong economic opportunity wherever it exists.

We have mentioned the effects of emigration on population growth. From 1962 through 1966, emigration exceeded net population increase in Greece. In recent years, opportunities in the industrial countries of Europe have been major attractions, with West Germany the destination of about 70 percent of the emigrants. Australia has also received large numbers. While these emigrants are not necessarily the same people who left the farms, many of them are. Of the occupations of emigrants, the "farmer and farm laborer" groups were dominant, about two-fifths, followed by unclassified laborers and craftsmen. Nearly half the total number emigrating appeared to be housewives and family members.

After 1960, over 80 percent of the emigrants were in the 15-44 year age group, and in 1962, the proportion was over 90 percent. This has important cumulative effects



on characteristics of the remaining population, by affecting potential productivity and birth rates.

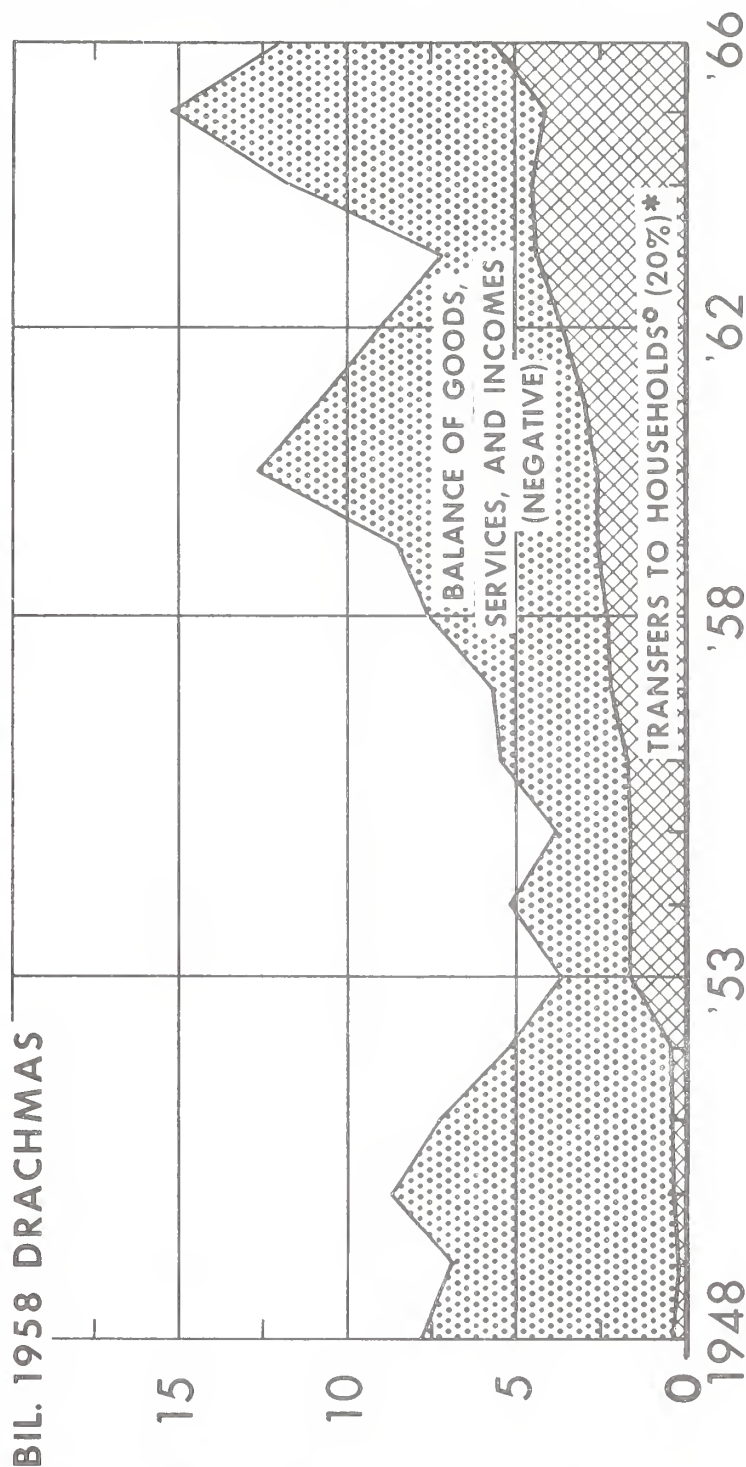
### Financial Aspects of Emigration

The investment that Greece had in the surplus population that emigrated was not entirely a gratuity to the countries of destination. Strong and persistent ties to family and the Greek nation and culture lead to a heavy return flow of remittances. These characteristics are not unique to Greece, but the scale of emigration in relation to population is very high compared with that of most other countries. This return flow of income enters the National Accounts under the heading "Current transfers from the rest of the world, to households." They are defined by the U.N. to include "personal and institutional remittances and migrants' transfers, whether in cash or in kind . . . to households and private non-profit institutions," and are further explained to include "ordinary migrant's remittances . . . to dependent relatives . . ." (71).

Remittances of permanent emigrants are supplemented by earnings accumulated by workers who migrate in a more or less regular seasonal pattern. The annual number of these is far less than that of permanent emigrants now living outside of Greece, but the annual amount returned per individual can be expected to be substantially more. While the data include transfers to private nonprofit institutions, that the quantities are mostly remittances from emigrants (permanent and temporary) is supported by reasonably close agreement of the data with a series -- "emigrant remittances" -- reported in the Statistical Yearbook of Greece (55). The National Accounts series is used in figure 15 to relate it with the other series from the National Accounts.

In 1948-50, the annual amount returned to Greece averaged 280 million 1958 drachmas; in 1957-59, it was 2,417 million; and in 1964-66, 5,159 million. The amounts were 3.6, 32.8, and 39.7 percent, respectively, of the average deficit in the balance of goods, services, and incomes in those 3-year periods. No information is available on the scale of individual remittances. However, the rate of migration suggests that the number of Greek emigrants gainfully employed throughout the world is possibly on the order of a million or more. Therefore, individual remittances are not large, from some points of view. However, to a rural family in Greece, only a small part of the income of a semiskilled construction worker in the United States would be a substantial income supplement, and the same would apply on a higher order at the level of a university professor in the United States relative to that of a professional worker in Greece.

# TRADE BALANCES AND TRANSFERS TO HOUSEHOLDS, GREECE



\*GROWTH RATE, 1948-50 TO 1964-66. ● FROM REST OF THE WORLD.  
ANALYSIS BASED ON TIMESPANS OF UNEQUAL LENGTH.

U.S. DEPARTMENT OF AGRICULTURE

NEG. ERS 7768-70 (10) ECONOMIC RESEARCH SERVICE

Figure 15

## CHAPTER V.--SOURCES OF TECHNOLOGY AND INFORMATION

Growth in productivity in agriculture arises from application of levels of technology that are progressively more advanced. This process has three basic components -- the technology itself; the means of its dissemination; and the levels of training needed to identify and develop technology, to disseminate it, and to assimilate and apply it.

### Sources of Technology

The term "technology," as commonly applied to development, and specifically to growth problems of the agricultural sector, is very broad in concept. Thus used, it refers to new means of expanding the cropland area through clearing, drainage, irrigation, and the like; it emphasizes new plant and animal varieties and equipment; and it relies on organizing and managing resources to increase output from inputs of land, labor, and capital. Sources of technology can be external or internal, or some combination of the two. When, as in Greece, the Government assumes a major leadership and support role in development, it engages actively in the importation and development of technology.

### How Technology Was Supplied

The growth of Greek agriculture after World War II passed through three typical stages of acquiring technology. The first is the somewhat casual importation of technology from external sources, with relatively little planning and control. This stage was less important in Greece than in many other countries; Greek research and the organized approach to development of the agricultural sector carried over from before the war.

Thus, after World War II, Greece was well started on the second stage, adaptive research. This still depends on imported technology, but importation is deliberate and controlled; technology is systematically screened for items that work best in the country involved; and emphasis is given to means of dissemination. At the same time, scientists are trained in local and foreign universities, to provide staffing of research institutions and to strengthen the university system itself.

In the third stage, basic research assumes a progressively more important role. More of the technology itself is generated within the country, and is specifically designed for local environments. Greece is in this stage.

One way of measuring research input is by examining the ratio of researchers to national population. In the early 1960's, slightly more than 100 persons were doing agricultural research. Greece in 1960 had more agricultural research workers per 100,000 people active in agriculture than India, the Philippines, Mexico, Pakistan, and Thailand had, but less than Argentina, Yugoslavia, Japan, and Taiwan had (36).

Distribution of research workers according to product fairly closely approximated that of the shares of each product in total agricultural output in 1964. Regional distribution was quite irregular as 60 and 17 percent of the researchers were located in Macedonia and Central Greece, respectively. The agricultural universities at Thessaloniki and Athens partially explain this concentration.

The following examples illustrate the research situation in 1968.

Cotton.--This crop has long been traditional in some of the semimountainous areas of southern Epirus, Central Greece, Thessaly, Macedonia, and Thrace. The technology was somewhat indifferent, in that cotton was a commercial enterprise on the small, subsistence-oriented farms of the area. In recent years, land area in cotton has been around 1.5 million stremmas, while production has increased 40 percent, and 90 percent of the production is now from irrigated plains. Increases in yields are attributed to increases in proportion irrigated and improved technology that includes variety, early planting, hoeing, thinning, water management, pest control, and fertilizers -- the latter of least importance (48).

Detailed data show that area in cotton increased rapidly until 1954, and then declined except for a very high level in 1961-63 (fig. 16). That sharp increase in cotton area coincided with a decline in wheat area that followed a period of low wheat prices. The decline in cotton area was probably partially induced by shortages of labor for picking. Cotton yields shifted upward after 1956, with striking increases after 1961. In the short period of the data series beginning in 1962, the proportion irrigated increased. Earlier observations had estimated 37 percent irrigated in 1953 and 57 percent in 1958.

Greek cotton is "medium staple," averaging about 1 3/32-inches fiber length. Until very recently, leading varieties have been adopted from U.S. sources, Coker from the Carolinas and Acala from California. The main work of the Cotton Research Institute has been in breeding for a type best suited to Greek needs, including resistance to prevalent diseases. The Institute's major success has been a variety designated 4S, and by 1967, 3 years after its release, it was grown on 75 percent of the area and was expected to reach 85-90 percent in 1968. This rate of adoption is in large part the result of effective control of the supply of cottonseed by the Government. 4S is similar to Acala 442, but is higher yielding than either of the imported varieties, an earlier type, and well adapted to machine picking. Earliness is of prime importance because in northern Greece, cotton matures barely ahead of the rainy season, when picking becomes expensive and quality deteriorates rapidly. The continuing cotton-breeding program of the Institute emphasizes even earlier maturity and maintenance of resistance to diseases.

Cereal crops.--Research is carried on by the Cereals Institute near Thessaloniki, by its three branch stations, and by cooperative work with other institutes of the Ministry. This institute was started in the 1930's, but it was almost entirely inactive from 1940 to 1950, and during that period, no contribution was made to increasing wheat production. The Institute is organized in commodity divisions -- wheat, rice, barley, corn, vegetables, oats, and others; and it also has a seed production division to multiply and supply primary seed of recommended varieties. Quantity seed production is located in 45 centers of seed production throughout Greece (47).

The Institute has a dual program -- basic plant breeding and testing of foreign varieties. About 90 percent of the present varieties are of domestic origin and 10 percent are foreign. Some remote areas persist in using indigenous varieties. Greece needs varieties of wheat for high and low altitudes, cold and hot environments, and fertile and poor soils. At present, about 15 varieties are recommended, some for quite limited areas and others for wide use. The three major components of wheat technology that have increased yields are wheat varieties, mechanization, and fertilizers. Yields "started" at an average of 80 kilograms per stremma and are now over 200 kilograms. Top yields are now 400 kilos for soft wheat and 300 for durum. Lower yields for durum are partly a varietal limitation, but durum also must be grown on poorer soils to attain acceptable quality levels. The Institute believes that available genetic potentials for wheat productivity are now fairly well exploited in present varieties.



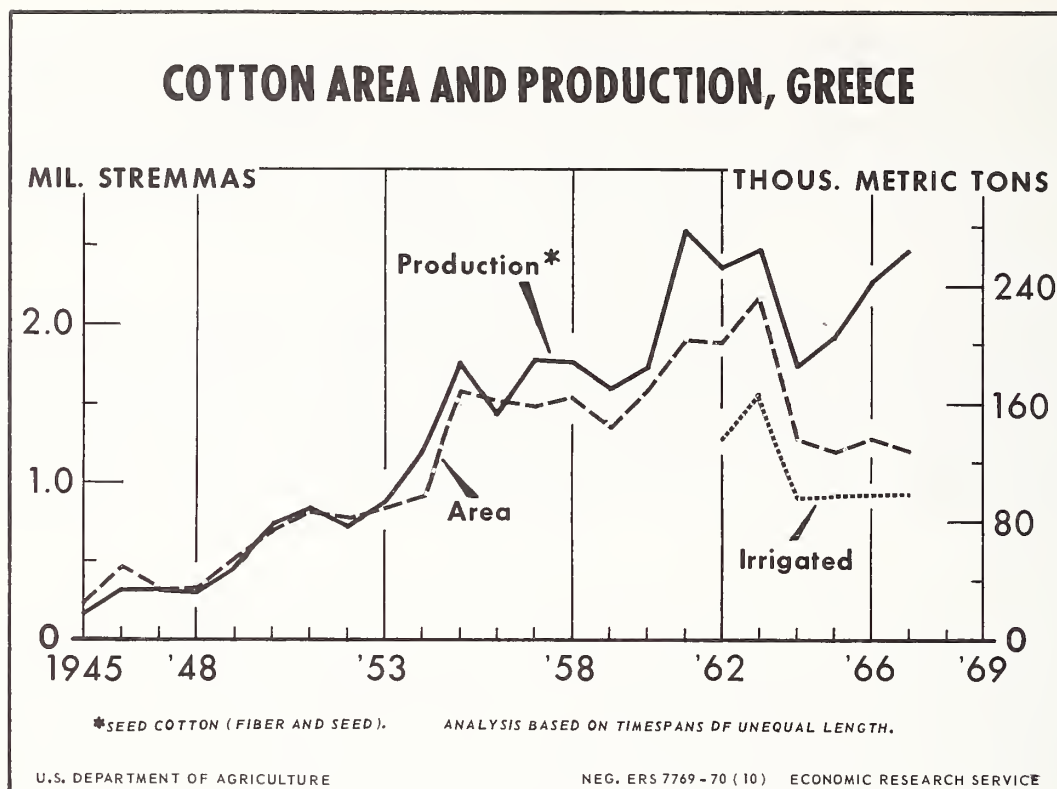


Figure 16

In 1945, Institute personnel began work with American corn varieties. But by developing hybrids from old Greek varieties, they have been using their own corn types since 1955. Of imported varieties, only Ohio No. 92, a variety adapted to very fertile soils, does as well as Greek strains. Varieties have been developed for all soils and climates where corn is grown in Greece. Data from tests in other Mediterranean countries show the Greek hybrids to be very productive.

New varieties for dry soils yield 100 percent more than do indigenous varieties, and for fertile soils, 200 percent more than do old varieties. Well-managed corn on fertile soils in the Thessaloniki area yields 900 kilos per stremma and top yields are 1,200 kilos. The national average, 1965-67, was 224 kilos per stremma, with the high regional yield at 292 kilos in Macedonia. The problem is that the "peasant" is somewhat suspicious and does not easily accept new varieties of corn. About 35 percent of the growers are using them, but these growers have the larger areas. One difficulty is that much of the crop is grown on such small plots that a harvest of twice as much as the year before is not conspicuous. The Government has intensified its program of introduction of new varieties.

Livestock.--The Livestock Institute, some distance west of Thessaloniki, was opened in 1961 on 4,000 stremmas of land, all irrigable but not yet fully equipped and developed. The use of improved land in 1968 was:

Stremmas

|                   |          |
|-------------------|----------|
| Pasture .....     | 350      |
| Alfalfa .....     | 1,000    |
| Corn .....        | 700      |
| Cereals .....     | 1,000    |
| Cotton .....      | 50       |
| Sugar beets ..... | <u>8</u> |
| Total .....       | 3,108    |

Because of some double cropping, such as for corn and barley, probably substantially less than 3,000 stremmas were actually developed. The Institute earns about five-eighths of its current operating and investment costs and depends on public support for the balance (49).

In addition to the Institute, there are five livestock "stations;" three of them are artificial insemination centers and two are research stations. Besides these there are three research stations with mixed crop and livestock programs. The total livestock research program is not closely coordinated at the field level. The Institute program includes improving nutrition of cattle, sheep, and hogs; improving the breed of sheep; increasing Holstein and Brown Swiss stock -- pure and mixed; providing hog-breeding stock; and supporting and improving bee culture, sericulture, and breeding of fur animals and rabbits.

The old standard of sheep's milk production was 70 kilos per ewe per year. Now some of the best flocks are up to 150 to 200 kilos. This increase is attributed quite directly to the importations of feed grains under P.L. 480. Feeds were made available, widely distributed, and used, and farmers learned to feed better. Feed is now available through commercial channels and is still used -- 100 drachmas invested in feed yields 200 drachmas in return, which is a strong incentive. About 20 percent of the sheep are near irrigated areas where the farmer produces most of his own basic feed-stuffs. Others less favorably situated depend more on purchased feeds.

The breeding program for sheep is directed to increasing milk productivity. Efforts to introduce new bloodlines have not been successful. One reason is that the genetic stock is limited -- most of the milk sheep are concentrated in a relatively limited area of the world, near the eastern Mediterranean. Some breeds with superior milk-producing qualities have characteristics not suitable to the local environment; thus, transfer of milking capability to an adapted type will be a slow process. The immediate best prospects appear to be in selection from indigenous types.

The cattle program is oriented to production of both milk and beef to upgrade diets through domestic production. Depending on the amount of hay he can produce, a farmer typically has two or three or up to five cows. The resulting small and scattered production does not result in milk of fluid quality; hence, the price received is too low to encourage high levels of inputs -- these farmers cannot afford many concentrates. Quality of stock is improving -- 70 percent of the cows in the country are now artificially inseminated. The greatest needs now are to produce animals for beef and to build up a system for producing quality milk.

Breeding gilts are distributed to specialists who produce weaner pigs that are sold typically singly or in small numbers to villagers. These pigs are kept 4 or 5 months, living as scavengers rather than being well-fed. Other programs of the Institute are problem-oriented and effective, and each program is very important, but to relatively fewer people than are programs on sheep, cattle, and hogs.

Mechanical technology.--Development in the irrigated areas of the Thessaloniki plain and associated areas is supported by the Land Reclamation Service, particularly the Land Equipment Branch in Thessaloniki. Programs are very broad and involve active participation in development of the Thessaloniki plain and other irrigable areas that provide major growth potential for agriculture in Greece. The particular example below relates to the area served by the above branch (50).

One activity of declining importance has been the providing of machinery for land preparation, planting, and harvesting. Farmers generally have their own equipment. But the branch supplies technical assistance to farmers in the mechanization process. The major activity is custom work for farmers in irrigation development -- land leveling, drainage, ditching, and drilling wells.

Land leveling and drainage is covering 50,000 to 70,000 stremmas per year. A rough average cost is 400 to 500 drachmas per stremma (\$60 per acre), of which the farmer pays one-half in 20 years, without interest. He also has the same arrangement on "third-order" ditches, and he maintains them. He pays 15 to 25 drachmas annually per stremma (\$2.00 to \$3.33 per acre) for water and maintenance of the drainage system (except for rice, which is 45-65 drachmas).

Wells are being drilled at the rate of about 100 per year in the higher and rolling areas adjoining the plains, and on the plains in advance of proposed gravity distribution systems and land leveling. Wells are especially important in the fruit-producing areas. One well usually serves five to seven average farms of about 50 stremmas each. Electric power for pumping is the most common. Farmers generally would like more land but none is for sale. Farms in the area are less fragmented than in most of Greece, and further fragmentation is controlled.

Sugar beets are mostly hand-dug and harvested, but labor problems are stimulating interest in mechanical harvesters. Acreage is restricted by the Government, with allotments handled by the processor. The allotment carries with it certain specifications for the technology to be applied.

Cotton area is not restricted, and there is a cotton promotional organization that provides technical assistance. On the Thessaloniki plain, about one-third of the land is cropped with barley or wheat over the winter and maize in the summer. The rest of the land is available for long-season summer crops, such as cotton and sugar beets, or for alfalfa. Burley tobacco is a new and increasing project crop, some of it under contract to German firms. There are many minor crops, ranging from irrigated pastures to intensive vegetables, potatoes, and grapes (the latter more important in the rougher land areas).

Productivity is fairly high. Most farmers use fertilizers -- typically 40-60 kilos per stremma of some complete formula, with the specific application based on advice from the Extension Division in the Ministry of Agriculture and the Agricultural Bank. Some yields mentioned were sugar beets at 3 to 7 tons per stremma, with 17 percent sugar, and maize at 500 to 700 kilos. Income per stremma ranges from 2,000 drachmas to 4,000 or 5,000; the higher returns, from orchards. Cost of water to the farmer is a very small part of this gross return.

In total, the research program seems to have been productive, especially in producing improved and new crop varieties, and, more recently, in improving livestock. However, several weaknesses are evident. Staffing has been inadequate, not in terms of the quality of the people who were there, but in numbers. This reflects inadequate fiscal support, which limits both the salary levels needed to attract and hold the limited number of trained scientists in the country and the expansion of research programs to include problems needing attention. Overall direction of research has

not been well coordinated. Not all agricultural research within the Ministry of Agriculture is under the Directorate of Research, and some is independent of the Ministry.

Management type of research seemed most deficient. It would be a natural outgrowth of research coordination and it is especially significant in the highly diversified type of agriculture prevalent in Greece. It would assist the Extension Division in integrating into the farmer's decisionmaking processes the material from the diverse products of the individual research institutes and stations. Further, until the Extension Division is relieved of excessive administrative duties, the necessary interchange between the field staff and research agencies will not develop. Finally, the teaching and research capabilities and resources of the universities have not been well integrated with the research and extension programs of the Ministry.

### Dissemination of Technology

Information on technology gets to farmers in numerous and complex ways. It can be part of the sales program of a distributor of equipment or materials. It can be tied to a contract, as in the case of a sugarbeet allotment. Another way is through the subsidy system used in irrigation development. For important industrial crops like cotton and tobacco, trade and producer organizations promote technology to effect quality control and increase output. For instance, the tobacco association is a major distributor of pesticides. As noted above, a cotton group works with growers on technology and the Government controls the seed used.

But the above methods cover only a small part of the farmers, commodities, and technology. The bulk of dissemination becomes an institutional function of the Government. In Greece, the two main institutions representing Government inputs to induce the use of improved technology are the Agricultural Bank and the Extension Division. The effectiveness of extension campaigns often depends on actively involving farmers in the process.

### The Extension Division

With U.S. technical assistance, the Extension Division, as mentioned, was established in the Ministry of Agriculture in 1950. The assistance included sending many individuals to the United States for training. By 1955, the Division was staffed at a level that remained fairly constant through 1963 (table 23). The number in 1966 was 387, but there were 500 authorized posts. On the average, the field agent was responsible for 15 to 20 rural communities containing some 2,500 farm families. In 1968, the Extension Division employed 176 new agronomists for work in the more developed regions.

Financial support provided by the Government gained generally through 1963. The number of cooperating farmers changed very little over the years reported.

A partial listing of items in the extension programs follows:

- 1.--Subsidizing production means in mountainous regions;
- 2.--Implementing "law 4035" for expansion of fruits and vegetables;
- 3.--Local administration of general subsidy schemes to implement the program for increasing productivity and changes in the cropping pattern;



Table 23.--Extension activities, 1955-63

| Year       | Agriculturalists<br>employed | Budget of Extension<br>Division <u>1/</u> | Cooperating<br>farmers |
|------------|------------------------------|---|------------------------|
|            | <u>Number</u>                | <u>Million 1957-59<br/>drachmas</u>       | <u>Number</u>          |
| 1955 ..... | 335                          | 10.9                                      | 120,000                |
| 1956 ..... | 359                          | 10.4                                      | 125,000                |
| 1957 ..... | 353                          | 11.1                                      | 125,000                |
| 1958 ..... | 382                          | 13.9                                      | 130,000                |
| 1959 ..... | 380                          | 15.5                                      | 135,000                |
| 1960 ..... | 390                          | 19.7                                      | 140,000                |
| 1961 ..... | 345                          | 21.9                                      | 135,000                |
| 1962 ..... | 335                          | 29.4                                      | 135,000                |
| 1963 ..... | 325                          | 18.9                                      | 130,000                |

1/ Excludes home economics.

Source: (23, table 96).

4.--Income support for small farms producing raisins, wheat, figs, cotton, and other crops;

5.--Land consolidation;

6.--Technology of plant pest control;

7.--Fertilizer use;

8.--Changing the cropping pattern in the main areas of oriental tobacco, developing roads and wells, and increasing use of machinery; and

9.--Dissemination of improved seed -- a program of the Ministry based on materials and information from research (54).

This list is indicative of problems that beset the Extension Division during this development period. The agent was overburdened with action programs of the Ministry that involved dealing with individual farmers. The major one of these programs was income support based on size of farm, provided through payments per stremma of specific crops grown. The agent was obligated to prepare lists of names and data basic to subsidy payment. Thus, he had duties with priority over educational and technical assistance activities that dominate extension programs in other countries.

The Extension Division was obligated by law to cooperate with the Agricultural Bank, which promoted technology in the management of its individual farm loans. The Division preferred working with groups and mass media, especially through meetings and committees. For example, the committee approach was used to regulate use of wells, and meetings were held to promote the livestock program. The Division had a small farm recordkeeping program and conducted evening courses for young farmer clubs. In practice, agents did not have time to work as closely with research institutes and stations as they would have liked, but the material nonetheless entered the extension programs.

The Division had staffing problems because the agents lived away from the cities, often in remote towns. However, entry to most positions in the Ministry depended on at least 3 years in the field with Extension.

In the early 1960's, the individual agents had not yet become recognized as local personal representatives of the Ministry of Agriculture. They did not have the means -- they lacked transportation and status. More recently, their salaries have been raised; they now live fairly well and can get around and make themselves known. Most now have automobiles, and the Government pays mileage -- the equivalent of about 8-1/2 cents per mile -- to operate small cars on poor roads.

#### The Agricultural Bank

The Bank had a technical services division dealing mainly with lending operations. This division was slightly larger than the Extension Division of the Ministry, and each professional member of the Bank's division processed about 1,000 loan applications a year. The division gave advice on the use of fertilizers, seeds, new cropping practices, and livestock management. Thus, bank loans were a form of supervised credit, and borrowers received only amounts of fertilizers the Bank's agriculturalists deemed appropriate. About 15 percent of the 1961 Bank staff had had advanced training in other countries, mostly in the United States.

#### Research Institutes and Centers for Agricultural Education

Research institutes and centers participated in producer education by holding short courses. They also distributed seed and were general centers for promoting improved farming methods and providing production advice. After 1962, 25 centers for agricultural education were established to offer short courses for farmers, and the goal is to establish 60 of these -- roughly one for each 20,000 farms. In 1968, about 11,000 farmers attended short courses.

#### Farmers' Participation

Effectiveness in disseminating technology to farmers is enhanced by the positive means of bringing them into direct contact with the sources of technology. Yet only 13 percent of the farmers were classed by the Extension Division as participating farmers in 1963, and the Bank staff processed perhaps 350,000 to 400,000 loans. These figures are not necessarily additive -- borrowers may be the best extension cooperators. Christensen emphasizes the role of farmers' associations and cooperatives in Taiwan, where almost every farmer participated actively in one or more organizations that provided some kind of service, from information, through supplying inputs, to marketing (2). The situation in Taiwan is far different from that in Greece.

In general, farmers had few organizational structures through which they might have become involved. Cooperatives provided the main opportunities but they had limitations that suppressed their potentials as effective institutions, for reasons that will be discussed in the next chapter. Without local organizational structures through which to work, the Extension Division had to use other approaches that succeeded only partially in providing regular points of contact.

Farmers had little opportunity to participate in Government, as the local units were very small and exercised little responsibility. Government tax resources and action at the central level far exceeded those of local government. In 1964-66, central Government taxes made up 96 percent of the total central and local government

taxes collected. In 1948-50, the central Government's share had been 93 percent, and a decade earlier, it had received 89 percent. Total taxes at 1958 constant prices increased at an average annual rate of 9.1 percent during 1948-50 to 1964-66. While central Government taxes, both indirect and direct, increased at a rate of 8.5 percent, taxes of the local authorities increased at only 4.4 percent. Consequently, local governmental units lacked resources required for effective organization and action.

### Education and Training

Formal education and training facilitates, and is often essential to, the ability to develop, disseminate, and assimilate technology. This ability ranges from the intensive specialized training required for basic research through the broad general training required for extension to the basic literacy required to "read the instructions on the label."

### Literacy

At the time of the study, a relatively high proportion of the Greek people were literate. The 1961 census reported that 82 percent aged 10 years and over were able to read and write (table 24). Progress in literacy has been rapid, as shown by its increase among younger age groups. Those 65 and over had their primary education around 1900, when less than half those alive in 1961 were being reached; those in the 30-44 age group from the mid-1920's to 1940; and those aged 20-24 in the immediate post-World War II period. The percentage of literate females has progressed much faster than that of males -- only 20 percent were literate in 1907, compared with 60 percent of the males; by 1961, the proportions were 73 and 92 percent.

The number of students in primary schools in 1964 was less than in 1937, 965,782 vs. 1,001,064. This appears to relate to aging of the population. In 1965, there were fewer persons aged 0-14 years than in 1951. The long-run trend of the aging of population is indicated by the decrease in the proportion of the population aged 0-19 years, from 45 percent in 1920 to 34 percent in 1965. In the secondary schools, in contrast, the number of students in 1965 was 227,469, or 2.6 times the 86,957 in 1937.

The proportion literate and the level of education attained are positively associated with the degree of urbanization (table 25). Rural areas suffer the greatest disadvantage at the secondary level, with only 1.6 percent of their population aged 10 years and over having a secondary education in 1961, in contrast to 14.3 percent in urban areas. Selective migration, as well as lack of educational opportunity, probably contributed to this. At the primary level, the proportion obtaining education in the urban and rural areas was more nearly equal.

### Advanced and Technical Training

Persons in agriculture and related occupations in 1961 with training completed beyond the secondary level (university and other "higher" schools) or with primary or secondary vocational and technical training were very low in absolute numbers and as proportions of the agricultural population (table 26). Numbers of persons in education and training during the one school year 1964-65 and of those who completed university and higher level school training that year emphasize the minute proportion of people in agriculture who are in technical or advanced training, and the very small output of trained people in any one year.

Table 24.--Literacy of population aged 10 years and over, by group, 1961

| Age group          | Proportion literate |
|--------------------|---------------------|
|                    | Percent             |
| 65 and over .....  | 48.8                |
| 45-64 .....        | 70.2                |
| 30-44 .....        | 88.5                |
| 25-29 .....        | 88.8                |
| 20-24 .....        | 93.0                |
| 15-19 .....        | 96.5                |
| 10-14 .....        | 97.7                |
| Total, 10 and over | 82.2                |

Source: (55).

Table 25.--Educational and literacy levels of population aged 10 years and over related to degree of urbanization, 1961

| Area                   | Population distribution | Level of education attained |           |         |                       |              | Level of literacy |
|------------------------|-------------------------|-----------------------------|-----------|---------|-----------------------|--------------|-------------------|
|                        |                         | Higher                      | Secondary | Primary | Primary not completed | Not declared |                   |
|                        |                         | Percent                     |           |         |                       |              |                   |
| Urban .....            | 44.8                    | 3.1                         | 14.3      | 46.7    | 35.4                  | 0.5          | 88.2              |
| Semiurban <u>1/</u> .. | 12.9                    | 1.2                         | 4.1       | 43.5    | 50.9                  | 0.3          | 81.5              |
| Rural .....            | 42.3                    | 0.6                         | 1.6       | 39.8    | 57.6                  | 0.4          | 76.1              |
| Total .....            | 100.0                   | 1.8                         | 7.6       | 43.4    | 46.8                  | 0.4          | 82.2              |

1/ Centers of 2,000 to 9,999, outside of urban agglomerations.

Source: (55).



Table 26.--University and technical training in agriculture and other fields,  
1961 and 1964-65

| Training                     | :Completing training:<br>: by 1961 : |  | In training, 1964-65 school year <u>1/</u> |               |   |                |
|------------------------------|--------------------------------------|--|--|---------------|---|----------------|
|                              | :Number:                             | :Percentage<br>: of occupa-<br>: tional<br>: group | : Numbers :                                |               | : Percentage of<br>: occupational group |                |
|                              |                                      |  | :Students:                                 | :Graduates:   | :Students:                              | :Graduates:    |
|                              | <u>Number</u>                        | <u>Percent</u>                                     | <u>Number</u>                              | <u>Number</u> | <u>Percent</u>                          | <u>Percent</u> |
| University: <u>2/</u>        |                                      |  |  |               |   |                |
| Agricultural <u>3/</u> ..... | 3,945                                | 0.08   | 2,388                                      | 207           | 0.0520                                  | 0.0045         |
| Other .....                  | 120,123                              | 3.30   | 50,917                                     | 6,120         | 1.2857                                  | 0.1547         |
| Total population ..          | 124,068                              | 1.48   | 53,305                                     | 6,337         | 0.6234                                  | 0.0741         |
| Vocational: <u>4/</u>        |                                      |  |  |               |   |                |
| Agricultural <u>3/</u> ..... | 11,386                               | 0.24   | 543  | <u>5/</u>     | 0.9118                                  | <u>5/</u>      |
| Other .....                  | 124,190                              | 3.41   | 71,374                                     | <u>5/</u>     | 1.8022                                  | <u>5/</u>      |

1/ Compiled from tables with slightly different wording -- 1964-65 was in terms of enrollment in agricultural and nonagricultural schools.

2/ Or other higher level, beyond secondary schools.

3/ And related fields; for example, forestry, veterinary medicine, and rural surveying.

4/ Vocational training at levels of primary or secondary schools.

5/ Not reported.

Source: Compiled from (55).

### Higher Education

The higher educational system comprises the universities and other institutions of higher learning, and the technical schools. In the first group, there were seven in 1951 and 14 by 1964-65. Figures include two schools of agriculture, a veterinary school, and two schools of home economics. Technical-vocational training in agriculture was offered in eight public schools, with a total of 40 staff members and 313 students, and in two private schools, with a total of 36 staff members and 230 students (55). The ratio of those graduating from the higher institutions in agriculture to all other graduates in 1964-65 was about the same as in 1961; that is, one in agriculture to 30 in all other occupations. However, in the technical-vocational category, the agricultural proportion dropped to less than 1 percent in 1964-65 from almost 10 percent in 1961.

At the secondary level of education, the two traditional curriculums are the classics and science. These feature study of Latin, ancient Greek, the liberal arts, and basic science, and this results in little learning about the value of practical experiments. These two curriculums have now been supplemented with six occupational training branches -- technical studies, economics, merchant marine, agriculture, domestic economy, and languages. But social prestige is still exclusively enjoyed by

the classics; technical studies are considered lower class. These new branches also suffer from a lack of qualified teachers. As a result, the enrollment rate for technical education at the secondary level is the lowest in Europe -- despite the demand for technically trained people in all fields (65). While the number of technical-vocational students had increased by about 2-1/4 times from 1937 to 1964 -- from 31,692 to 71,917 -- the number in higher education had increased 4-2/3 times -- from 10,561 to 49,532. Thus, higher education has shown a faster growth than much-needed technical-vocational education (70).

### Support of Education

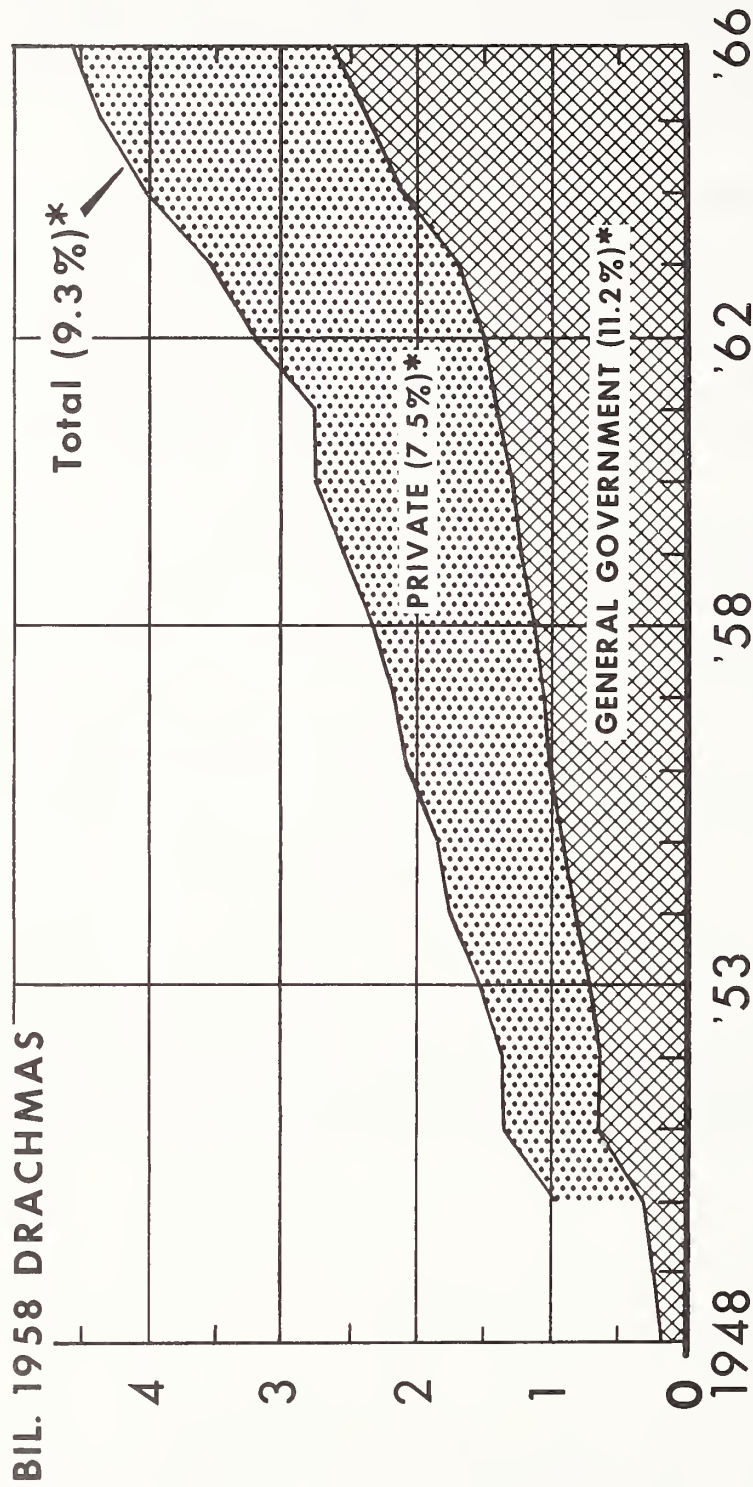
Public education is provided by the State and private education by individuals or legal entities of private law, and the degree of participation of each entity varies with the level of studies. In primary education, private participation is of small importance except in Athens, but it becomes quite important at the secondary level. In technical education, private participation exceeds that of public. Higher educational institutions are largely financed by the State (44 and 45). Public and private participation have grown rapidly, and the Government's contribution dominates (fig. 17). The total was about 3.4 percent of GDP in 1966.

The University of Thessaloniki with about 23,000 students is one example of the system of higher education in Greece. Relatively, the agricultural enrollment is small, with about 300 entering the curriculum each year. Entrance to the university is by competitive examination, with about twice as many applying each year as can be accepted. All education is free beyond board and room -- books, tuition, and so on, are at no cost to the student. This practice allows a high degree of social mobility through education (57).

A serious problem is economic opportunity after graduation -- there are just too many doctors, lawyers, and veterinarians. Aside from those who can enter family businesses, university graduates find their best opportunities in Government agencies. The primary business organization in Greece is the family type, leaving little room to accommodate qualifications and goals of university-trained people in the private sector. On the other hand, technical training is readily marketable. The untrained find their best opportunities in the service industries. These considerations are important in establishing priorities for the expansion of the educational system.

Perhaps this analysis leads to the conclusion that Greece can afford to export well-educated people and the unskilled, but needs the intermediate level to participate in the development of agriculture, industry, and commerce. However, the number being trained and the number already trained in agriculture and agriculturally related fields is small at all levels in the educational cycle and is not surplus to the needs.

# CURRENT EDUCATION EXPENDITURES, GREECE



\*GROWTH RATE, 1950-52 TO 1964-66.

ANALYSIS BASED ON TIMESPANS OF UNEQUAL LENGTH.

U.S. DEPARTMENT OF AGRICULTURE

NEG. ERS 7770-70 (10) ECONOMIC RESEARCH SERVICE

Figure 17

## CHAPTER VI.--THE ECONOMIC ENVIRONMENT

The assumption basic to this chapter is that production decisions in the agricultural sector are economically motivated. This appears to have a high degree of relevance to the performance of Greek agriculture in the study period. The economic forces examined are prices, bonuses, and incentives; input prices and supplies; credit policies and institutions; cooperatives, markets, and marketing institutions; and throughout, the Government influence on the economic environment. These forces each have individual characteristics as a central theme but are interrelated to the extent that they cannot be discussed entirely independently.

### The European Economic Community (EEC)

In 1962, Greece became an associate member of the EEC. Long-term implications of harmonization of certain policies, participation in financial provisions of the Common Agricultural Policy, and complete customs union may be more significant than the immediate results. However, harmonization has already led to changes in pricing policies, and trade provisions have helped Greece to compete in European markets. Harmonization means adjustments in policies to the end that products of member states and the same products of Greece receive equal treatment in the markets of all. The financial provisions include two funds supported by member states: (1) to finance the pricing and marketing system through support purchasing and export subsidization, and (2) to assist in structural reform of agriculture throughout the EEC.

The customs union is intended to eventually do away with intra-Community tariffs, and in the interim period of gradual adjustment, equality of application is to be maintained. Interim provisions for Greece included intra-Community rates for important fruit and vegetable products and no increases above 1962 rates on other products. The tobacco tariff was halved and was to be eliminated after 1967, and import levels were to be set according to a quota system. Full membership was projected after 22 years (1984).

### Prices, Bonuses, and Subsidies

Price-support programs in the form of minimum-price guarantees were in effect in Greece before World War II. Thus, when the country was in a position to recover and develop, a precedent had been established. Supported prices were supplemented by bonuses and subsidies, especially in the latter half of the study period. Bonuses are payments or other benefits generally offered for specific items of performance, usually to increase output and production efficiency of specific commodities. Subsidies, on the other hand, tend to have as their basic objective the raising of incomes of farmers, especially those with small and unproductive farms, through income transfers. These have also had the effect of bonuses or price supports, when applied in certain ways. Objectives are not always clearly identified.

Over 50 supports or subsidies for crop, livestock, and input items were in effect in 1965, compared with 14 in 1961 (table 27). Information for 1967 shows three or four additions and about 20 discontinued. Faced with this amount of detail, the farmer with a diversified farm organization or with several close alternatives would find decision-making extremely complicated, and establishing and administering the program would be a major task.

In 1961, the Government supported prices for major cereal crops and some fodders, subsidized income from cotton, peaches, sultanas, currants, and olive oil, and subsidized purchases of fuel and fertilizers. By 1965, the list of products supported was



Table 27.--Price supports and production subsidies, 1961, 1965, and 1967

| Product or input                 | Basis of support or subsidy | Level of support or subsidy |           |                    |
|----------------------------------|-----------------------------|-----------------------------|-----------|--------------------|
|                                  |                             | 1961                        | 1965      | 1967               |
| Cereals and Fodder:              |                             |                             |           |                    |
| Wheat:                           |                             |                             |           |                    |
| Basic price .....                | Dr per kg.                  | 2.70                        | 2.60      | <u>1/2.60</u>      |
| Special prices --                |                             |                             |           |                    |
| up to 30 stremmas .....          | do.                         | 3.60                        | 3.00      | 2.60               |
| 31-40 stremmas .....             | do.                         | 3.225                       | 3.00      | 2.60               |
| 41-100 stremmas .....            | do.                         |                             | 2.80      | 2.60               |
| Average price .....              | do.                         | 3.11                        | 2.95      | 2.56               |
| Barley .....                     | do.                         | 2.70                        | 2.60      | 2.60               |
| Rye .....                        | do.                         | 2.50                        | 2.70      | 2.60               |
| Maize .....                      | do.                         |                             | 2.40      | 2.70               |
| Rice (husked):                   |                             |                             |           |                    |
| Round-seeded .....               | do.                         | 3.20                        | 3.50      | 3.70               |
| Middle-seeded .....              | do.                         |                             |           | 4.40               |
| Long-seeded .....                | do.                         | 4.20                        | 4.50      | 4.70               |
| Alfalfa:                         |                             |                             |           |                    |
| Irrigated .....                  | Dr per stremma              | None                        | 140       | None               |
| Nonirrigated .....               | do.                         | None                        | 140       | None               |
| Clover .....                     | do.                         | 25                          | 100       | None               |
| Pulses .....                     | do.                         | 25                          | 25        | None               |
| Livestock and milk:              |                             |                             |           |                    |
| Veal .....                       | Dr per kg.                  | None                        | 2         | None               |
| Cow's milk .....                 | do.                         | None                        | 0.60-0.90 | 0.60-0.90          |
| Heifer purchase (local) .....    | Pct. of value               | None                        | 30        | 30                 |
| Heifer purchase (imported) ..... | do.                         | None                        | 40        | 30                 |
| Small-animal purchase .....      | do.                         | None                        | 30        | 30                 |
| Veterinary chemicals .....       | do.                         | None                        | 50        | 50                 |
| Cotton:                          |                             |                             |           |                    |
| Irrigated .....                  | Dr per stremma              | 80                          | 150       | 1.6 per kg.        |
| Nonirrigated .....               | do.                         | 50                          | 90        |                    |
| Cultivators .....                | Pct. of value               | None                        | 20-40     | <u>2/35</u>        |
| Mechanical pickers .....         | do.                         | None                        | None      | <u>3/40</u>        |
| Pesticides .....                 | do.                         | None                        | 30        | None               |
| Fruits and vegetables:           |                             |                             |           |                    |
| Peaches .....                    | Dr per kg.                  | 0.30-0.50                   | 0.30-0.60 | None               |
| Citrus .....                     | do.                         | None                        | 0.20-0.50 | <u>4/None</u>      |
| Tomatoes .....                   | do.                         | None                        | 0.05-0.30 | None               |
| Grapes .....                     | do.                         | None                        | 0.50-0.90 | <u>5/0.50-0.90</u> |
| Apples .....                     | do.                         | None                        | 0         | <u>5/0.30</u>      |
| Potatoes .....                   | do.                         | None                        | 0.40-0.50 | <u>0.50-0.80</u>   |
| Onion seed and vegetables .....  | do.                         | None                        | 0.60      | <u>5/0.50</u>      |
| Mastic .....                     | do.                         | None                        | 10        | 15                 |
| Wine .....                       | do.                         | None                        | 0.50      | 0.50-1.00          |
| Sultanas (average) .....         | do.                         | 7.00                        | 10.00     | <u>6/7.00</u>      |
| Currants (average) .....         | do.                         | 6.00                        | 9.00      | <u>6/7.50</u>      |

Note: See footnotes at end of table.

Continued--

Table 27.--Price supports and production subsidies, 1961, 1965, and 1967 -- Continued

| Product or input           | Basis of support:<br>or subsidy | Level of support or subsidy |           |             |
|----------------------------|---------------------------------|-----------------------------|-----------|-------------|
|                            |                                 | 1961                        | 1965      | 1967        |
| Sugar beets:               |                                 |                             |           |             |
| Beets .....                | Dr per kg.                      | None                        | None      | None        |
| Sprayers .....             | Pct. of value                   | None                        | 40        | None        |
| Olive oil .....            | Dr per kg.                      | 16.50                       | 20.00     | 21.50       |
| Cocoons:                   |                                 |                             |           |             |
| Dry .....                  | do.                             | None                        | 12.5      | None        |
| Fresh .....                | do.                             | None                        | 5.0       | None        |
| Seeds:                     |                                 |                             |           |             |
| Barley and oats .....      | do.                             | None                        | 1.0       | 0.50-1.45   |
| Maize .....                | do.                             | None                        | 1.50-4.05 | 7/2.00-4.00 |
| Pulses .....               | do.                             | None                        | 2.50-3.05 | 0.75-5.25   |
| Alfalfa .....              | do.                             | None                        | 1.25      | 14.30       |
| Clovers .....              | do.                             | None                        | 3.20-8.20 | 3.30-19.00  |
| Sorghum .....              | do.                             | None                        | 1.00      | None        |
| Cotton .....               | do.                             | None                        | 2.70-2.90 | 3.50-3.75   |
| Miscellaneous:             |                                 |                             |           |             |
| Fuel .....                 | Dr per ton                      | 1500                        | 1500      | None        |
| Single-axle tractors ..... | Pct. of value                   | None                        | 30        | 30          |
| General machinery .....    | do.                             | None                        | None      | 30.0-50.0   |
| Fertilizers .....          | do.                             | 10-30                       | 10-30     | 10-30       |
| Farm buildings .....       | do.                             | None                        | 30        | None        |
| Processing plants .....    | do.                             | None                        | 30        | None        |
| Mulberry trees .....       | Dr per stremma                  | None                        | 1500      | None        |
| Vineyard replanting .....  | do.                             | None                        | 320       | 8/          |

1/ Unique price for all quantities purchased by State intervention. Not differentiated by category of producers.

2/ Water pumps and other machinery have been added.

3/ The mechanical harvesting program has been expanded. Subsidies are granted for special cultivation machinery (cultivators) as well as to modernize gin factories to enable ginning of cotton harvested by mechanical pickers (35-40 percent of value). In addition, a subsidy of 1 drachma is granted for every kilogram of cotton picked by mechanical pickers.

4/ At the end of the marketing season, a direct supplement of market price was granted to citrus growers as an income support to secure them the following prices:

For oranges -- 1.10-2 drachmas, according to variety.

For lemons -- 2-2.20 drachmas, according to variety.

For mandarins -- 2.50 drachmas, according to variety.

5/ As an income support to producers.

6/ To support small raisin-growers (1-20 stremmas), an income support is granted, ranging from 200 to 700 drachmas per stremma for currants and from 300 to 1000 drachmas for sultanas, according to the category of the grower.

7/ A subsidy of 200 drachmas per stremma was granted in 1966 for the expansion of hybrid corn as a double crop.

8/ A number of new activities have been included.

Source: (52 and 62).

not only greatly lengthened, but the composition presented some interesting changes. In keeping with the program to increase domestic production of animal-derived foods, the following occurred: (1) alfalfa, veal, milk, and the purchase of breeding heifers and veterinary supplies were added to the list; (2) mechanization was encouraged by a 20- to 40-percent subsidy on machinery purchases; (3) fruits and vegetables were supported to encourage exports; and (4) seeds were widely subsidized to encourage use of improved varieties. Sugar beet planting had been subsidized during the previous 2 years.

Some very important changes appeared in the 1967 list. The first was movement toward harmonization with the EEC. Previously, wheat prices included, for smaller farms, a schedule of differentials above the base price. However, the EEC specified maximum levels at which prices of competitive commodities could be supported (which characteristically became minimums); and income subsidies that would bring returns above that level could not enter the price structure. Therefore, Greece gave income subsidies for small farms a clearly separate identity. In 1965, when the base support for wheat was 2.60 drachmas per kilogram, the average price including special subsidies for small farms was 2.95; in 1967, when the price was again 2.60, an average of 2.56 was paid, but no subsidies were included.

In 1967, the maize support price was raised to 2.70 drachmas per kilogram, and, on the other hand, payments on forage and fodder crops were omitted. The cotton bonus of 150 and 90 drachmas per stremma of irrigated and nonirrigated land, respectively, was changed to a straight 1.6 drachmas per kilogram of ginned cotton. Subsidies on peaches and tomatoes were discontinued, while the straight bonus on citrus was changed to a supplemental payment over returns from exports to bring total prices received by farmers to specified minimum levels. These recent changes seem to have been made for a variety of reasons. One was definitely to achieve harmonization with the EEC. Other reasons were that (1) efforts to attain certain goals had succeeded and programs were no longer needed; (2) production efficiency had advanced to the point where producers were receiving adequate returns; (3) the system had become too complex to operate effectively; and (4) the total cost had become too high for the Government to carry under current accounts.

Examples of the 1965 cost of selected price supports and subsidies in million drachmas were: wheat, 228; other cereals and fodder, 148; livestock and milk, 189; tobacco, 242; cotton, 219; sultanas and currants, 362; other fruits and vegetables, 323; olives, 114; seed, 28; fertilizer, 20; agricultural credit, 236; agricultural industries, 25; and mountain and island development, 36. The total was 2,214 million drachmas, or \$74 million.

#### Subsidies for Small Farms

Subsidies of various kinds available to farmers with small farms were oriented to social and political objectives rather than to production. These subsidies were offered in a variety of forms, one important example being the scaling of wheat prices in favor of these farmers. The Greek Government is well aware of the problem of too many farmers and the effects of subsidies in delaying migration from farms. Theirs was a deliberate holding action to keep these people where they were because other economic opportunities were not developing fast enough in the cities to absorb them. People were better off in a subsistence situation on farms than they would have been in city slums. The public support required to provide those subsidies was less than the cost for economic support (relief) in cities, where all food and housing is bought.

## The Wheat Program

Self-sufficiency in wheat is a reasonable objective for Greece because wheat appears to have a favorable advantage in the cropping pattern in the commercial areas of northern Greece, and it is also established as an important subsistence and small cash crop throughout the country. While the aggregate production from small enterprises is important, main responses to economic stimuli are in the commercial area. Use of price to encourage production favored application of technology to increase yields and induced farmers to devote land to wheat instead of to competing crops.

From 1945 to 1967, the area, output, and yield (productivity) of wheat increased markedly, but erratically (fig. 18). Area planted varied usually in response to price. However, in 1949, it was low due to political disturbances and in 1963, due to weather. The pre-World War II area was regained by 1950, but it grew continually until 1959, when it tended to drop off again, except in 1964. Productivity recovered by 1948, and, except for annual variations, increased moderately until 1957. In that year, the increase appeared as a shift rather than a trend, similar to the gains in productivity after 1963. In its pattern, output followed yields more closely than area did, except in 1965-67. The yield increase in 1957 led to the accumulation of surplus for export in 1959. Again, beginning in 1964, increased yields and the large acreage that one year, led to the accumulation of surplus for export in 1966.

While self-sufficiency is a desirable goal, surpluses are not. Average annual production of 1,758,000 tons in 1957-59 resulted in an accumulated 163,000 tons that had to be exported, and over 500,000 tons in 1966, from average annual production of 2,039,000 tons in 1964-66. Greece could not afford to export large surpluses. The EEC had a surplus of white wheat, so Greece marketed where it could in 1966, at world prices of about \$57 a ton. But with the support prices in effect during the 3 years of accumulation, it cost the Government around \$95 a ton. At a net loss of \$38 a ton, total loss was on the order of \$19 million, not counting internal transportation and handling costs.

Domestic demand was estimated at around 1.65 million tons in 1966, and it is projected to remain at that level in 1970-72, according to the Agricultural Development Plan (51). This level is about 94 index points in figure 18. Therefore, the 1967 crop threatened further surpluses for export. As it happened, yields were very low in 1968 and imports were required to supply the demand.

The pricing program had positive effects on wheat production -- most directly on acreage planted; however, in the longer run, the program inevitably affected productivity because favorable prices made application of improved technology profitable. The index of current prices rose rapidly from 1949 to 1956, while the area was also increasing greatly (fig. 19). The increase in area in 1959, in the face of lowered prices, reflects the practice of announcing support levels after the planting season; thus, the response was to 1958 prices. Lowered yields and output induced an upward price adjustment in 1961 that was reflected in 1962 area; 1962 was also a year of high yields and output. Again, the Government countered with lowered prices. The extreme reduction in area in 1963 was, in fact, more weather induced than a response to prices -- adverse weather in the planting season prevented planting of much intended land, especially in major commercial areas. Wheat area dropped almost 15 percent, 1.6 million hectares. The concurrent decline in other grains indicates barley was not substituted, substantiating that the reduction was unintended. The main compensation was a half-million-hectare increase in summer crops -- tobacco, cotton, and others.

The resulting short supply led to a major price increase in 1964; and for the first time, the price was announced before planting. A record area of wheat resulted, and combined with record yields, the resulting crop set off the period of surplus accumulation. Prices were dropped over the next 2 years, and area fell sharply, but continued high yields partially offset these declines.



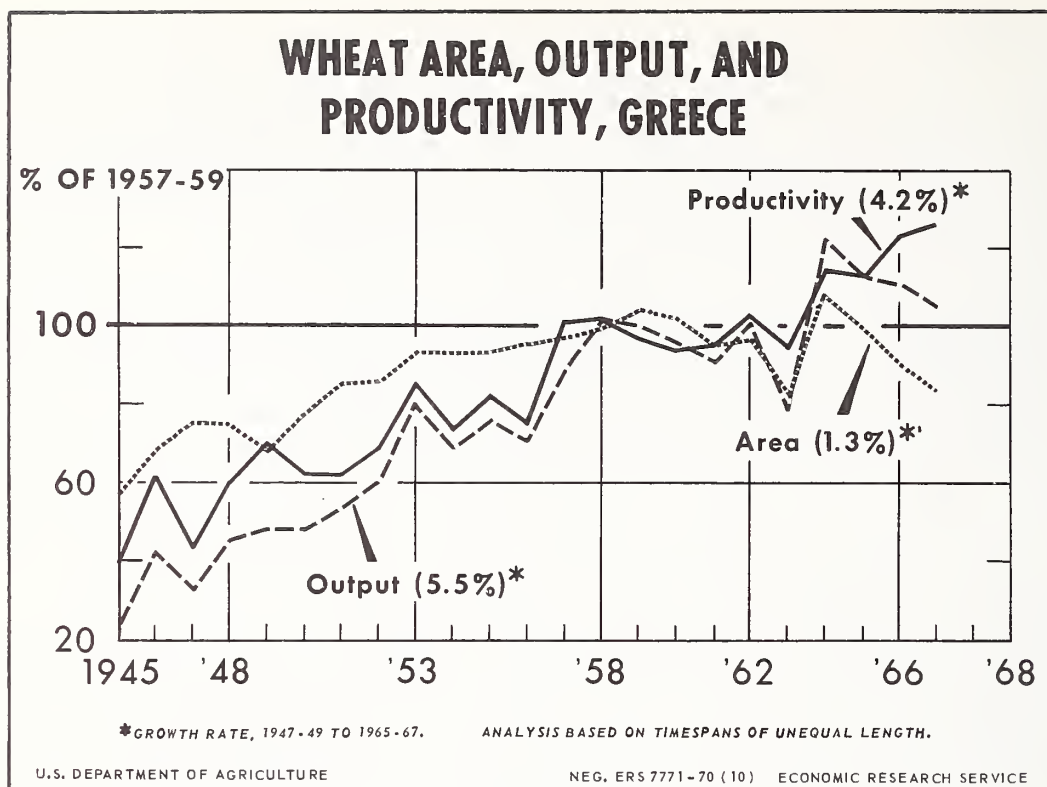


Figure 18

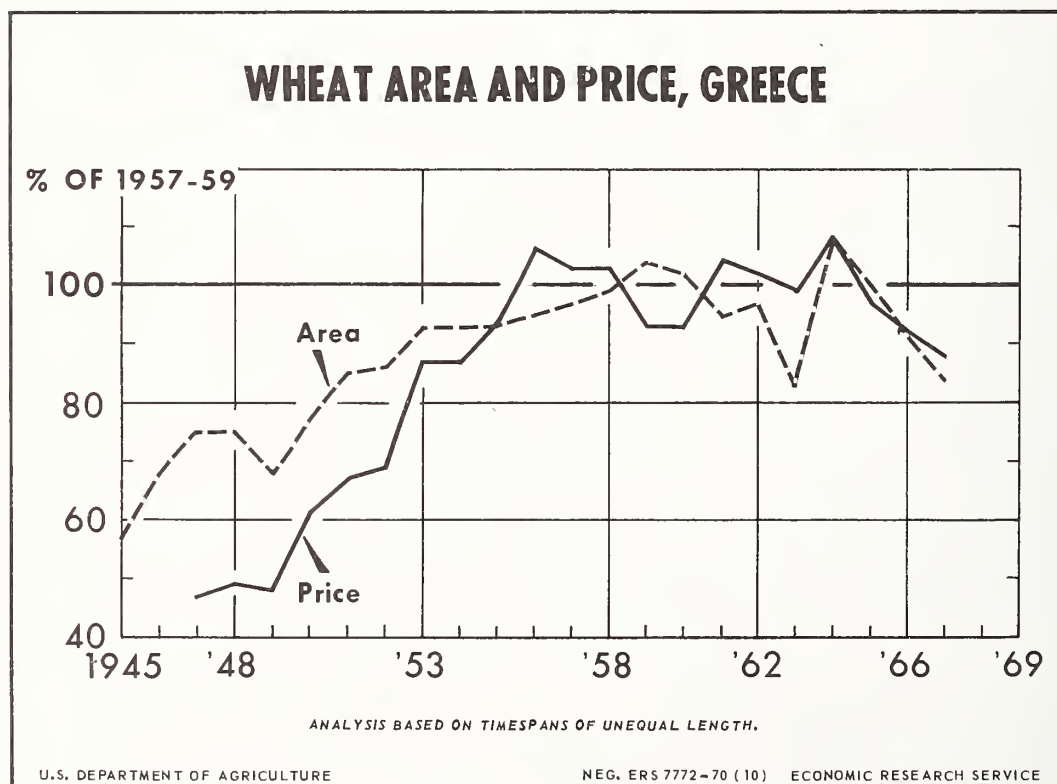


Figure 19

Durum wheat is a commodity distinct in many ways from white wheat. Not only are its uses different, but it is a substitute only in limited environments -- those areas that are relatively dry while the crop is maturing. Not only are these low-yielding areas, but durum yields only about 75 percent as much as white wheat under the same conditions. Therefore, to induce substitution on farms, the price for durum needs to be on the order of one-third or more higher. Not only does Greece import durum, but the EEC also is in short supply and is a potential market for any surplus Greece might be able to produce.

#### Beef Prices in Relation to Feed Grains

While feed grain prices increased from 1960 to 1966, beef prices increased relatively more (table 28). Thus beef production was encouraged toward the end of the period. Barley and corn prices fell in 1966, and the ratios of the beef price to barley and to corn became extremely favorable. These ratios remained much less favorable than those in the United States, until about 1964.

From 1960 to 1966, production of feed grains (TDN basis) increased at an 8.2-percent annual compound rate compared with production of meat, which increased at only a 7.7-percent rate (10). Net imports of grain and meat resulted in an 11.7-percent compound annual increase in total TDN available for livestock and a 10.0-percent increase in total meat supplies during the period. Imports of feed grains (TDN basis) expanded at a 25.5-percent annual rate, while meat imports increased at a 17.6-percent rate. Feed grains made up the largest proportion of the value of commodities imported under P.L. 480 agreements. They were 43.9 percent of the value of commodities imported under Title I agreements signed July 1, 1954, through December 31, 1966, and 57.9 percent of those imported under Title IV agreements during calendar year 1966.

A common practice was the sale by farmers of home-produced grain at relatively high domestic prices, and then the purchase on credit of imported feed grains -- particularly U.S. maize that was imported on very favorable terms (40). In 1967, potential feed concentrates were being exported from Greece at a price of about 1.65 to 1.95 drachmas a kilogram (\$55 to \$65 a metric ton), while wheat and barley were being offered to livestock producers at 2.10 drachmas a kilogram (10). Thus, pricing policies were hardly optimal to livestock production. They resulted in a loss for the national treasury because of the maladjustment of grain production to national and international demands.

Traditionally in Greece, livestock is slaughtered at light weights. Not only are veal and very young lambs preferred for tenderness and flavor characteristics, but fat meat is not liked from animals of any age. As a result, potential productivity of the individual lamb or calf that is produced at a relatively high cost is not exploited -- the weight that can be added during the animal's period of rapid growth is relatively low-cost. From about 1966 to 1968, the Government offered farmers a bonus of 2 drachmas a kilogram for beef animals slaughtered over 300 kilograms (660 pounds). The resulting beef was not acceptable to consumers because of the fat -- a problem recognized but not resolved in 1968.

The broiler industry in Greece was reported in 1968 to be inefficient. The feed conversion rate was on the order of 2-1/2 pounds of feed per pound of broiler produced. At the same time, the standard in Germany was 2 pounds of feed or even less. As a result, broilers were being imported from that country at about 40 drachmas per kilogram. The Common Market arrangement left the Greek producers with no alternative but to meet competition through increasing efficiency if they were to stay in business.

Table 28.--Feed grain and beef cattle prices and price ratios, Greece and the United States, 1960-66

| Year       | : Feed grain prices per bushel : |      |                   |      | : Beef cattle :<br>price per :<br>hundredweight : |          | : Beef cattle/feed grain<br>price ratios <u>1/</u> : |      |          |      |
|------------|----------------------------------|------|-------------------|------|---|----------|--|------|----------|------|
|            | : Barley :                       |      | : Corn :          |      | : Greece :  | : U.S. : | : Barley :   |      | : Corn : |      |
|            | : Greece : U.S. :                |      | : Greece : U.S. : |      |   |          | : Greece : U.S. :                                    |      |          |      |
|            | : ----- Dollars ----- :          |      |                   |      |   |          |  |      |          |      |
| 1960 ..... | 1.56                             | 0.84 | 1.74              | 1.00 | 29.88   | 25.93    | 9.2  | 14.8 | 9.6      | 14.5 |
| 1961 ..... | 1.57                             | .98  | 1.74              | 1.10 | 30.81   | 24.46    | 9.4  | 12.0 | 9.9      | 12.5 |
| 1962 ..... | 1.58                             | .91  | 1.80              | 1.12 | 29.42   | 27.20    | 8.9  | 14.3 | 9.2      | 14.1 |
| 1963 ..... | 1.68                             | .90  | 1.87              | 1.11 | 29.98   | 23.79    | 8.6  | 12.7 | 9.0      | 12.0 |
| 1964 ..... | 1.73                             | .95  | 1.95              | 1.17 | 36.91   | 22.86    | 10.3   | 11.5 | 10.6     | 10.9 |
| 1965 ..... | 1.81                             | 1.02 | 2.23              | 1.16 | 41.72   | 25.81    | 11.1   | 12.2 | 10.5     | 12.5 |
| 1966 ..... | 1.65                             | 1.05 | 2.14              | 1.24 | 42.68   | 26.17    | 12.4   | 11.9 | 11.2     | 11.8 |

1/ The ratios represent the price of a pound of beef divided by the price of a pound of feed grain.

Source: Compiled from data from (33, 52, and 72).

#### Agricultural Credit

The Agricultural Bank was practically synonymous with agricultural credit in Greece during the development period. Set up in 1929 to help with problems arising from agrarian reform and assimilation of returning population, it became one of the most important economic bodies in the country, and was the main agency for implementing agricultural policy. Relevant functions, among others, were to:

- 1.--Provide credit to farmers and their cooperatives;
- 2.--Provide farm supplies;
- 3.--Assist cooperatives in storing, processing, and marketing of agricultural products, domestically, and for export; and
- 4.--Promote technology through advice and means, and provide insurance for harvests, stock, and property of farmers and cooperatives.

The bank was governed by a board representing the Ministry of Agriculture, the National Bank, Ministry of Coordination, agricultural education, the Panhellenic Confederation of Agricultural Cooperative Union (CPUCA) and the cooperatives, and independent farmers, chaired by the governor of the bank. Most of its funds were supplied by the National Bank of Greece, although the Agricultural Bank had deposits, reserves, and an insurance fund. Neither through deposits nor subscriptions to cooperatives was the credit system able to generate an appreciable amount of funding from farmers themselves.

Central headquarters of the bank in Athens, with a staff of over 700, had three main "directorates:" Credit, which dealt with all loan operations and was required to directly approve a large proportion of loans granted; Cooperative, which supervised cooperatives; and Technical, made up of specialists in various farm commodities and in

organizational and management problem areas. The 150 branches of the bank all had "offices" corresponding to these three directorates and a total of almost 3,000 employees.

As a major means of implementing policy in agriculture, the bank was also of great importance as a force in the growth of the agricultural sector. A few salient features clarify its importance; fuller descriptions are available from a number of sources, one of which is a primary basis for the following summary (11).

Both crop and collateral loans are short-term credits to individual farmers (table 29). The latter were available to farmers on crops that had been harvested but not sold -- about 90 percent of these loans were on tobacco. Crop and collateral loans together accounted for 50 to 64 percent of the amount advanced by the bank in various years. Short-term loans to cooperatives included re-lending to farmers, as well as financing the purchase, processing, storing, and marketing of commodities. Medium- and long-term loans ran from 2 to 20 years, the latter for 9 or more years, and made up a small proportion of the total. One estimate is that 70 percent of the medium- and long-term loans were to farmers and 30 percent to cooperatives.

The 5,637 million drachmas advanced in 1960 equaled 25 percent of gross domestic agricultural product that year; in 1965, it was 24 percent. Except in 1965, over 70 percent of the credit appears to have gone to farmers and less than 30 percent to the cooperatives.

Short-term loans to farmers are often called "cultivation" loans. About 90 percent of the farmers were estimated to have used these annually. A proportion of most loans -- about 30 percent, recently -- included lending in kind in the form of fertilizer and other inputs. Amount of fertilizer was controlled, based on estimates of need made by the staff of the technical division. The bank had a virtual monopoly on fertilizer distribution and thus influenced policy implementation. Short-term loans totaled 7,700 million drachmas in 1966, and 7,985 million in 1967. Together, medium- and long-term loans amounted to 1,800 million in 1966, and 3,001 million in 1967. The total loaned was 9,500 million in 1966 and 10,986 million in 1967. Credit used in agriculture continued to grow.

Irrigation improvements and production animals were important uses of medium- and long-term loans throughout the period (table 30). Recent, rapid increases in mechanization supported by credit are very conspicuous, and there is a suggestion of increasing activity in the land market.

Interest rates charged farmers and cooperatives by the bank at selected times from 1949 to 1964 have declined (table 31). In the first part of the 1949-51 to 1957-59 period, the implicit deflator showed an inflation rate of about 7.5 percent; thus, the real interest rate was low -- even negative at times. Since then, inflation has been about 3 percent annually; thus, the real rate has been positive, but low (except the concessional rate of 2 percent used in some cases to promote development and other programs).

Operating costs of the bank had been around 6 to 7 percent of the value of loan operations. Interest rates were at or below this level; thus, operating losses resulted. The impact of these on the bank was not crippling because its funding was supplied by the National Bank of Greece. These losses were one means of transfer to the agricultural sector from the general account.

Record of repayment of loans is variable. Over time, both farmers and cooperatives had a good record of repayment. However, in 1964, the Government declared a moratorium on unpaid loans. In 1965, repayment rate by both classes of borrowers dropped substantially; one suggested reason is that borrowers anticipated another moratorium. Another



Table 29.--Distribution of loans by the Agricultural Bank, 1952-66

| Year          | Short-term loans          |      |                  |      |   |      | Medium- and long-term loans |      | Total loans  |
|---------------|---------------------------|------|------------------|------|---|------|-----------------------------|------|--------------|
|               | Cultivation or crop loans |      | Collateral loans |      | Loans to agricultural organizations <sup>1/</sup> |      | <sup>2/</sup>               |      |              |
|               |                           |      |                  |      |   |      |                             |      |              |
|               |                           |      |                  |      |   |      |                             |      |              |
|               | Mil. 1957-59              |      | Mil. 1957-59     |      | Mil. 1957-59                                      |      | Mil. 1957-59                |      | Mil. 1957-59 |
|               | dr                        | Pct. | dr               | Pct. | dr  | Pct. | dr                          | Pct. | dr           |
| 1952 .....    | 1,316                     | 60   | 300              | 14   | 400   | 18   | 181                         | 8    | 2,197        |
| 1953 .....    | 1,375                     | 55   | 395              | 16   | 613   | 24   | 113                         | 5    | 2,496        |
| 1954 .....    | 1,727                     | 58   | 469              | 16   | 577   | 19   | 202                         | 7    | 2,975        |
| 1955 .....    | 1,741                     | 58   | 513              | 17   | 566   | 19   | 169                         | 6    | 2,989        |
| 1956 .....    | 1,928                     | 55   | 704              | 20   | 574   | 16   | 320                         | 9    | 3,526        |
| 1957 .....    | 2,501                     | 55   | 813              | 18   | 717   | 16   | 526                         | 11   | 4,557        |
| 1958 .....    | 2,804                     | 55   | 776              | 15   | 752   | 15   | 738                         | 15   | 5,070        |
| 1959 .....    | 2,732                     | 54   | 673              | 13   | 616   | 12   | 1,010                       | 21   | 5,031        |
| 1960 .....    | 2,647                     | 52   | 525              | 10   | 772   | 16   | 1,131                       | 22   | 5,075        |
| 1961 .....    | 2,690                     | 51   | 635              | 12   | 873   | 17   | 1,053                       | 20   | 5,251        |
| 1962 .....    | 2,528                     | 51   | 796              | 16   | 893   | 18   | 736                         | 15   | 4,953        |
| 1963 .....    | 2,622                     | 47   | 958              | 17   | 1,203   | 21   | 838                         | 15   | 4,621        |
| 1964 .....    | 2,729                     | 42   | 933              | 14   | 1,663   | 26   | 1,159                       | 18   | 6,484        |
| 1965 .....    | 2,673                     | 39   | 794              | 11   | 2,210   | 32   | 1,270                       | 18   | 6,947        |
| 1966 .....    | 2,707                     | 39   | 654              | 9    | 2,284   | 33   | 1,319                       | 19   | 6,964        |
| 1952-54 ..... | 1,473                     | 58   | 388              | 15   | 530   | 21   | 165                         | 6    | 2,556        |
| 1957-59 ..... | 2,679                     | 55   | 754              | 15   | 695   | 14   | 758                         | 16   | 4,886        |
| 1964-66 ..... | 2,703                     | 40   | 794              | 12   | 2,052   | 30   | 1,249                       | 18   | 6,798        |
| Growth rate:  | ----- Pct. -----          |      |                  |      |   |      |                             |      |              |
| 1952-54       |                           |      |                  |      |   |      |                             |      |              |
| to            |                           |      |                  |      |   |      |                             |      |              |
| 1964-66 ...   | 5.2                       |      | 6.1              |      | 11.9  |      | 18.4                        |      | 8.6          |

1/ Organizations include cooperatives; amounts to Athens headquarters not included.

2/ Includes lending to cooperatives.

Source: (42).

Table 30.--Purposes of medium- and long-term loans, 1960-65

| Purpose   | 1960    | 1961    | 1962   | 1963   | 1964    | 1965    |
|---|---------|---------|--------|--------|---------|---------|
| <u>Million drachmas</u>                           |         |         |        |        |         |         |
| To farmers:                                       |         |         |        |        |         |         |
| Irrigation improvements ...:                      | 228     | 238     | 196    | 180    | 186     | 185     |
| Land improvements .....                           | 45      | 39      | 32     | 27     | 37      | 34      |
| Production animals .....                          | 188     | 200     | 122    | 88     | 106     | 168     |
| Draft animals .....                               | 46      | 39      | 25     | 23     | 27      | 18      |
| Machinery and tools .....                         | 93      | 92      | 76     | 130    | 261     | 316     |
| Viticulture .....                                 | 16      | 18      | 18     | 17     | 24      | 26      |
| Tree crops .....                                  | 28      | 28      | 25     | 25     | 37      | 26      |
| Purchase of land .....                            | 23      | 27      | 43     | 19     | 90      | 151     |
| Payments for damage from<br>acts of God .....     | ---     | ---     | ---    | ---    | 132     | 34      |
| Other improvements .....                          | 27      | 29      | 25     | 40     | 41      | 43      |
| Total .....                                       | 694     | 710     | 562    | 549    | 941     | 1,001   |
| To cooperatives:                                  |         |         |        |        |         |         |
| Agricultural buildings and<br>installations ..... | 274     | 253     | 162    | 261    | 349     | 486     |
| Agricultural industries ...:                      | 121     | 105     | 59     | 97     | 98      | 125     |
| Pools of unions of<br>cooperatives .....          | 43      | 3       | 5      | 27     | 5       | 25      |
| Total .....                                       | 438     | 361     | 226    | 385    | 452     | 636     |
| Other uses:                                       |         |         |        |        |         |         |
| Fisheries .....                                   | 29      | 12      | 9      | 45     | 13      | 28      |
| Forestry .....                                    | 13      | 11      | 11     | 13     | 18      | 20      |
| Total, all loans .....                            | 1,174   | 1,094   | 808    | 992    | 1,424   | 1,685   |
| <u>Percent</u>                                    |         |         |        |        |         |         |
| Percentage of 1960 .....                          | 100     | 94.4    | 68.8   | 84.5   | 121.3   | 143.5   |
| <u>Number</u>                                     |         |         |        |        |         |         |
| Total loans .....                                 | 131,418 | 141,159 | 99,958 | 99,180 | 158,656 | 127,385 |

Source: (62).

Table 31.--Rates of interest for agricultural lending, Agricultural Bank, 1949-66 1/

| Type of loan and borrower         | Jan. 1949<br>to<br>Jan. 1954 | Jan. 1954<br>to<br>Jan. 1957 | Jan. 1957<br>to<br>Jan. 1961 | Jan. 1961<br>to<br>Jan. 1964 | Jan. 1964<br>to<br>Jan. 1966 |
|-----------------------------------|------------------------------|------------------------------|------------------------------|------------------------------|------------------------------|
|                                   | <u>Percent</u>               |                              |                              |                              |                              |
| Cultivation and other             |                              |                              |                              |                              |                              |
| short-term loans: <u>2/</u>       |                              |                              |                              |                              |                              |
| To independent farmers ...        | 9                            | 7                            | 7                            | 6.50                         | 5                            |
| To cooperatives .....             | 8                            | 6.25                         | 6.25                         | 5.75                         | 4.25                         |
| To unions of cooperatives         | 7                            | 6                            | 6                            | 5.50                         | 4                            |
| Loans secured against farm        |                              |                              |                              |                              |                              |
| products: <u>2/</u>               |                              |                              |                              |                              |                              |
| To independent farmers ...        | 10.50                        | 8.50                         | 8.50                         | 7                            | 6                            |
| To cooperatives .....             | 9.50                         | 7.50                         | 7.50                         | 6.25                         | 5.25                         |
| To unions of cooperatives         | 8.50                         | 7                            | 7                            | 7                            | 5                            |
| Medium- and long-term             |                              |                              |                              |                              |                              |
| loans:                            |                              |                              |                              |                              |                              |
| To independent farmers ...        | 9.50                         | 7                            | 8                            | 7                            | 4                            |
| To cooperatives .....             | 8.50                         | 6.25                         | 7.25                         | 6.25                         | 3.50                         |
| To unions of cooperatives         | 7.50                         | 6                            | 7                            | 6                            | 3.50                         |
| Low-interest loans <u>3/</u> .... | ---                          | ---                          | ---                          | 2                            | 2                            |

1/ The rate of interest for loans in arrears was 7 percent.

2/ A lump-sum commission of 0.5 percent was charged independent farmers for their short-term and collateral loans. The corresponding charge for loans through cooperatives was 0.25 percent. The cooperatives also made a similar service charge that varied from 0.25 to 0.75 percent, according to the size of the loan. Thus, farmers who were members of cooperatives paid less for these loans than nonmembers did.

3/ After 1960, medium- and long-term loans for "certain purposes" were granted at 2 percent per annum; short-term loans to farmers afflicted by earthquakes and other acts of God were issued at 2-percent or less interest.

Source: (62).

was declared in 1968, creating considerable dissatisfaction among those who had already paid their loans; and observers believed that the act would further weaken the integrity of the credit system.

Cultivation loans were made directly to farmers through branches of the bank, or through first-degree cooperatives. The 30 percent who borrowed directly tended to be larger and more prosperous farmers, and loans made to them were larger than those that passed through the cooperatives. These independent farmers paid a 0.5-percent loan fee. The 70 percent who borrowed through cooperatives paid a 0.25-percent fee. The local cooperative as the intermediary collected loan applications and merchandise requests and took them to the bank branch. Without regular staffing, the president of the cooperative performed the services of taking loan applications of cooperators to the branch of the bank, bringing back and distributing money and supplies, and even overseeing to some extent the application of loans.

The Agricultural Bank was the only general source of credit for farmers, quite understandable at the interest rates charged. Private capital would not be attracted

to competition with bank sources. These interest rates are not indicative of the value of loan capital to the farmer, and no doubt, credit would have been used profitably for many purposes at a real capital-market rate, but less money would have been borrowed. Similarly, the bank financed at low interest rates the services provided by cooperatives. Certain of these services, besides that of price-support administration, required subsidy. An important one was costs to cooperatives of absorbing surpluses in years of high output or, conversely, of reducing their operations in low output years -- in contrast with private businesses that schedule their operations at fairly even levels in relation to established markets.

Aside from a few specific commodities, the great bulk of the buying, processing, and marketing of agricultural products in commercial channels was in private hands and financed privately. Data on private credit used was not available, but it must have been of great volume, and certainly the terms were not as favorable as those enjoyed by cooperatives.

### Cooperatives

Much has been written about farmer cooperatives in Greece. For this brief summary, the primary source is a report by the OECD, supplemented by general sources (11 and 62). Our main interest is their effects on growth of agricultural output and productivity -- how well they performed the functions for which they were organized. During the period studied, cooperatives had three levels -- first degree, which were local organizations of farmers; second degree, regional cooperative unions; and third degree, central cooperatives that specialized in marketing of products and distribution of means of production.

First-degree cooperatives were limited by the 1915 Cooperatives Act to the commune as the administrative area. As a result, these cooperatives were small -- about two-thirds had 100 members or less, and only 17 percent had over 200. The average was about 100. In some regions, such as the Peloponnesus or Epirus, 80 to 85 percent were in the 100-or-less category.

With this situation, when the membership was made up of farmers with small farms, the majority had low levels of income; hence, total business was limited, and the local cooperative was weak in scale of business and financial resources. The individual cooperative seldom had a shop or a paid secretary. In lieu of staff, second-degree cooperatives provided accounting services for a fee. DeLauwe and Poitevin estimated that the average subscription commitment per member was 1,000 drachmas (\$33), and that only part of this was paid.

The authors cited above failed to find a single example of a one-service cooperative. They did emphasize that above all the local cooperative provided credit on behalf of the Agricultural Bank. About one-fourth of the farmers dealt directly with the bank, and others wanting credit used the service of a cooperative. The second service was distribution of fertilizers and pesticides. The third was providing ordinary household supplies -- at usual prices, but with quality guaranteed. These three services were all classed as "consumer operations." Production of goods and services was a growing function (table 32).

Regional unions -- second-degree cooperatives -- could be formed by a minimum of seven first-degree cooperatives. There were 131 regional unions in 1960 in which 6,350 first-degree cooperatives participated, averaging 48 persons per cooperative or about 5,000 cooperators per union. These unions had 2,100 paid employees (about 16 each) against 400 full-time and 1500 part-time workers in all local cooperatives. "The real activity of the agricultural cooperative movement is almost exclusively concentrated in the regional unions." Each participating first-degree cooperative sent a delegate and an alternate to the union's general meeting.



Table 32.--Main activities of first-degree cooperatives, 1961

| Main activity                     | Cooperatives |         | Members           |         |
|-----------------------------------|--------------|---------|-------------------|---------|
|                                   | Number       | Percent | Number            | Percent |
| Consumption:                      |              |         |                   |         |
| Credit .....                      | 4,673<br>5   | 62      | 463,256<br>495    | 62      |
| Supply .....                      |              |         |                   |         |
| Production of goods and services: |              |         |                   |         |
| Farm produce processing .....     | 2,116<br>513 | 35      | 215,312<br>40,593 | 34      |
| Sales .....                       |              |         |                   |         |
| Miscellaneous .....               | 236          | 3       | 26,459            | 4       |
| Total .....                       | 7,543        | 100     | 746,115           | 100     |

Source: (11).

Third-degree cooperatives were organized as central unions, pools, or limited-liability cooperative societies. One of the two central unions was the Central Cooperative Union of Greek Oil Producers, which collected and packed olive oil and olives, assisted in domestic and foreign marketing, supplied machinery and equipment, and operated processing facilities. In 1962, this union collected about 20 percent of total olive oil output on behalf of the State. The other union was the Central Cooperative Union of Fig Producers, which provided technical assistance, stored and packed figs, and assisted in marketing. It handled about 70 percent of fig production and 10 percent of exports.

Of the cooperative pools, the Cooperative Unions Pool for Handling Home Produce (KYDEP) was most important. It was set up in 1940 to provision the country in general and farmers in particular. Three-quarters of the wheat collected in Greece passed through KYDEP, largely on behalf of the State, which made the pool responsible for purchasing at the guaranteed price and supplying the flour mills. KYDEP collected 10 percent of the cotton and organized its export. It also had responsibility for marketing certain secondary vegetable products for which no central unions existed. Finally, it had a State monopoly for importation, collection, and distribution of tested seed, especially cotton and potatoes. Another example is the Cooperative Pool of Sultana Producers, originally set up in 1940 to buy sultanas at support prices and export them at international prices. It also packed raisins, but the support program declined and the organization's activity was limited.

As a limited-liability cooperative society, the Cooperative Union of Greek Tobacco Producers, Ltd. (SEKE) is an outstanding example. It was set up to purchase, manufacture, sell, and export tobacco; manufacture cigarettes; and import various articles to sell domestically to offset tobacco exported. Of these articles, 70 percent were tractors and machinery; the rest, cars, trucks, and tools. SEKE bought about 10 percent of the tobacco and handled 13 percent of the exports. Its activities helped support prices for producers.

Another type of cooperative pool is the Cooperative Supply Company (SPE). KYDEP and SEKE, with a number of regional unions, organized SPE in 1949 to supply farmer members with tools, machinery, and other products. SPE distributed olive oil, soap,

chemical fertilizers, and farm and household equipment through three branches and the shops of 125 regional unions.

Most major products had a central union of some kind engaged in such activities as technical assistance, marketing, storage, processing, export, and, when these existed, implementation of programs of price supports, bonuses, and the like.

CPUCA, founded in 1935, directed the agricultural cooperative movement in Greece (11, p. 39 ff.). Its tasks were:

- 1.--Cooperative education of farmers and training of staff;
- 2.--Promotion and development of agricultural cooperative societies; and
- 3.--Defense of economic and social interests of cooperatives and their members.

CPUCA was an association of the third-degree cooperatives and 123 of the regional unions. As such, it had extended its influence directly over Greek agriculture and represented most of it. Thus, the association served "as a counterbalance for the movement vis-a-vis the public authorities and the representatives of private interests in the sectors concerned with marketing and processing of agricultural produce," and held "a defacto monopoly of agriculture's bargaining power vis-a-vis the state and other social and occupational groups." It was the only effective pressure group for agriculture as a whole.

In summary, a few significant conclusions stand out. The first-degree cooperatives were lending institutions. The effective base of cooperative organization was in the second-degree regional cooperatives. Third-degree cooperatives, each concerned with one commodity or at most a very few, provided various marketing services, technical assistance to producers, and certain inputs and specialized equipment. They also functioned as administrators of related State commodity programs, which existed for most major agricultural commodities. The central organization, CPUCA, was the apex of the pyramid and the central spokesman for the farmer. Yet the base was weak. The local cooperative was not the viable type of institution that could involve farmers actively in their own affairs, emphasize local participation in development, and enable the Extension Division to use it as a central point for disseminating information and assessing the needs and problems of farmers.

#### Markets and Marketing Institutions

The numerous and complex problems of marketing agricultural products in Greece resulted from the very rapid emergence of a commercial agriculture that had strong export elements, but was based on small farms. Sustained growth of the agricultural sector was highly dependent on the effectiveness of the marketing system in (1) assembling the output of these farms and delivering it to consumers domestically or in foreign markets, and (2) reflecting demand, quality, standardization, timing, and other requirements back to farmers through prices and other means. The marketing system had evolved from traditional organizations and facilities oriented to local situations. Basically, these were not suited to the present scale of national and international markets, and they were difficult to restructure. The problem was analyzed and reported in a number of studies, which, with general sources and observations, serve as the basis for a brief summary of major relevant points (15, 40, and 62, p. 70 ff.).

## Market Power

Small farms have little market power in themselves. Their individual quantities of products, emphasized by the typical diversification, make for a buyer's market. We have seen that despite the widespread participation in cooperatives, these were, in fact, not marketing cooperatives at the local level. The numerous third-degree commodity cooperatives did represent producers' interests as part of their purpose. They did this with only moderate success, more with some commodities than others. They tended to participate in the market of most commodities only marginally. Estimates vary, but cooperatives appeared to handle a very small percentage of total agricultural output -- probably well below 10 percent; but they handled a somewhat larger proportion of the amount that entered commercial channels.

For those commodities with price supports, the Government supplanted bargaining. Private trade could enter the market at supported prices; or it could enter at competitive prices and the Government would make up the differences, as with the citrus program in effect in 1967. Or the Government could be the principal buyer, as for wheat, with KYDEP as the agent.

## Quality Control

An agriculture oriented to subsistence and local markets has little concern with quality; however, as markets broaden, the importance of quality increases and becomes dominant in world competition. Certainly, much progress was made during the study period in achieving such quality objectives as producing varieties with characteristics the market wanted; attaining uniformity that facilitated modern packaging and display; introducing keeping qualities required for long-distance transport; and so on. But problems persisted that had great economic importance.

Raisins and peaches are examples. Small individual and unorganized raisin production in Greece simply did not produce the uniform and high-quality product that the sophisticated U.S. industry does. Peaches from Greece had good flavor but the color was not attractive. The Alberta variety dominated, maturing within a month, while the market could have absorbed peaches over a considerably longer period. When new areas suitable for oranges were developed through irrigation, navels were planted almost universally. Again, they ripened in a short period. Output of young trees was already saturating the market, and as these reached maturity, a surplus was expected to develop. The market could assimilate other varieties over a considerably longer period. The Government offered a subsidy of 30 drachmas a tree for the grafting of old plantations with more satisfactory varieties.

We have noted the problems with quality of milk and the market potential for durum wheat. The list of such problems is extensive, and much remains to be done.

## Transportation

In comparison with other developing nations, Greece has a rather good highway system, with 412 miles of paved roads per 1,000 square miles (28). Similar data for some other developing countries are:

|                   | <u>Miles of paved roads<br/>per 1,000 square miles</u> |
|-------------------|--|
| Philippines ..... | 310  |
| India .....       | 252  |
| Turkey .....      | 95   |
| Thailand .....    | 40   |
| Pakistan .....    | 70   |
| Taiwan .....      | 590  |

These roads connect major cities or coincide with major tourist routes.

Road improvement in Greece began with U.S. assistance in 1949, and by 1951, a total of 4,437 miles of third-class unpaved roads existed, 2.4 times the length of the pre-World War II network of such roads. Of the 44,000 kilometers of all roads in 1960, only 7,000 were paved, and many were hardly passable for motor vehicles.

The standards for road development in 1949 were adequate for needs then current for transport of staple commodities. As components of production shifted to more perishable commodities, demands for quality in the transportation system increased.

The railroad system is connected directly with the central European network and thus provides access to those markets. At times, shortages of refrigerated cars limited shipments of highly perishable produce in critical periods. A major highway provided similar access by truck but this transportation method does not seem to have been of great importance.

### Barter

Much of the trade with Eastern European countries is carried on through bilateral payments agreements, under which settlements are made through clearing accounts (8, p. 189). These are a form of barter covering specified quantities of goods to be exchanged. Experience with these varied. Greece got much needed wood products from Russia quite satisfactorily. Industrial products from Czechoslovakia were adequate but securing replacement parts was a problem. Greece usually received higher prices for her produce in this barter market than in Western Europe, offset by higher prices for goods in return. These countries were not exacting about quality, and thus, less discipline was imposed on Greek producers and the marketing system. But recipient countries sometimes re-exported to other markets at reduced prices, and these exports competed with direct Greek exports.

The bilateral agreements were negotiated between governments, but trade was carried on through normal channels; that is, products involved were exported and imported by cooperatives and other businesses.

### Fertilizer

The amount of fertilizer used in Greece over the study period was reported in chapter V, especially in table 17. We noted that supply and distribution was almost a monopoly of the Agricultural Bank, and that much of it was distributed as loans in kind through lending and distribution facilities of the cooperative system. About two-thirds of the crop land was estimated to have been fertilized in 1967, and it is reasonable to assume that a substantially larger proportion of farmers fertilized at least part of their land.

Questions remaining relate to the origins of supply; the policies followed to increase the amounts used; and the economic measures adopted to induce widespread use, beyond simply making the fertilizer available.

### Sources

Greece has produced phosphate for fertilizers since before World War II. In 1938, production reported was approximately 10,100 tons and use, approximately 7,700. Through 1960, domestic production about equaled consumption. Then consumption increased very rapidly and exceeded production until 1967, when production was 116,000 tons and use, 101,000.



Except for experimental amounts in 1956-58, nitrogen was not produced in Greece until 1963-64, when approximately 13,800 tons were produced and approximately 115,900, used. Output increased rapidly as capacity was added, and in 1966-67, approximately 131,600 tons were produced and approximately 145,100, used. All potash fertilizer is imported.

Information on the efficiency of all nitrogen fertilizer plants in Greece is not available; however, in 1966, it was noted that a new formulating plant in Thessaloniki had a source of ammonia "at international prices" from the nearby oil refinery.

Recent rapid growth of the domestic fertilizer industry resulted in the attainment of national self-sufficiency in production of nitrogenous, as well as phosphatic, fertilizers. The Agricultural Bank offered to purchase all existing stocks and the entire future output of domestic manufacturers (61). The importance of an efficient domestic fertilizer industry to agricultural development is evident in that farmers can be supplied at low cost and foreign exchange can be saved. In recent years, imports of fertilizers and materials cost 500 million 1958 drachmas, but for 1967 and 1968, comparable information that would show the effects of domestic production is not yet available. By 1969, controls were imposed on construction of new factories for, and imports of, fertilizers produced domestically. It appears that important policy decisions will be necessary in making the domestic level of fertilizer prices satisfactory for both the domestic fertilizer industry and the users.

### Prices

More important than absolute price levels of fertilizers is their relationship to product prices, and, in Greece, to the price of wheat; in some years half the fertilizer used was applied to that one crop (table 33). From 1957 to 1967, prices of nitrogen and phosphate, the principal nutrients used, declined. The ratio grew more favorable until 1965-67, when the price of wheat was low. This price relationship in Greece was favorable in 1964, compared with those of other selected countries (table 34). In the United Arab Republic, the price of wheat was low and that of fertilizer high; in India, they were both high; and in Pakistan, fertilizer prices were very low.

Prices in Greece, which declined generally from 1957 to 1964 and remained stable through 1967, were determined by the Agricultural Bank. It absorbed any difference between the cost of the supplies required and the price to farmers, and after the mid-1950's, this difference varied between 10 and 30 percent of the cost. For example, in 1956, the total value of supplies was 881 million drachmas, and the farmers paid 754 million -- a subsidy of 14.4 percent. In the process, some materials and the same material from different sources were subsidized more than others.

Another subsidy was in transportation; fertilizers were sold at the same prices to all farmers, regardless of a farm's location relative to central supply sources. This practice had complex implications when possible differences in land values based on location were involved. Commodity price supports were apparently administered on the same basis and with the same implications. Another point is that fertilizer prices were not determined by productivity. Rather, they were deliberately low to encourage expanded use. The amount used did not reflect the aggregate of the most profitable applications -- it was a total supply allocated to individual farmers by bank technicians in a system that emphasized broad distribution to as many farmers as possible.

Table 33.--Prices of fertilizer nutrients and fertilizer/wheat price ratios, 1957-67

| Cropyear      | Price per kilogram for -- |                 |   |                              | Fertilizer/wheat price ratios |   |                              |
|---------------|---------------------------|-----------------|---|------------------------------|-------------------------------|---|------------------------------|
|               | Wheat                     | Nitrogen<br>(N) | Phosphate<br>(P <sub>2</sub> O <sub>5</sub> ) | Potash<br>(K <sub>2</sub> O) | Nitrogen<br>(N)               | Phosphate<br>(P <sub>2</sub> O <sub>5</sub> ) | Potash<br>(K <sub>2</sub> O) |
|               |                           | <u>Cents</u>    |   |                              |                               |   |                              |
| 1957 .....    | 10.0                      | 27.8            | 23.5  | 10.0                         | 2.78                          | 2.35  | 1.00                         |
| 1958 .....    | 10.0                      | 26.3            | 26.3  | 10.0                         | 2.63                          | 2.36  | 1.00                         |
| 1959 .....    | 9.1                       | 27.9            | 23.7  | 11.1                         | 3.07                          | 2.60  | 1.22                         |
| 1962 .....    | 10.0                      | 24.6            | 16.1  | 11.0                         | 2.44                          | 1.59  | 1.09                         |
| 1963 .....    | 9.9                       | 25.9            | 17.1  | 11.0                         | 2.62                          | 1.77  | 1.11                         |
| 1964 .....    | 10.0                      | 23.8            | 14.3  | 11.3                         | 2.38                          | 1.43  | 1.13                         |
| 1965-67 ..... | 8.7                       | 23.8            | 14.3  | 11.3                         | 2.74                          | 1.64  | 1.30                         |

Source: (38).

Table 34.--Wheat prices and fertilizer/wheat price ratios, selected countries, 1964

| Country                    | Price of<br>wheat per<br>kilogram | Fertilizer/wheat price ratio |   |                              |
|----------------------------|-----------------------------------|------------------------------|---|------------------------------|
|                            |                                   | Nitrogen<br>(N)              | Phosphate<br>(P <sub>2</sub> O <sub>5</sub> ) | Potash<br>(K <sub>2</sub> O) |
|                            | <u>Cents</u>                      |                              |   |                              |
| United Arab Republic ..... | 6.1                               | 5.1                          | 2.8   | 1.9                          |
| India .....                | 12.2                              | 3.0                          | 2.5   | 1.1                          |
| United States .....        | 7.8                               | 3.4                          | 2.6   | 1.3                          |
| Spain .....                | 10.8                              | 2.7                          | 1.9   | 0.7                          |
| Greece .....               | 10.0                              | 2.4                          | 1.4   | 1.1                          |
| Japan .....                | 12.5                              | 2.1                          | 1.8   | 0.8                          |
| Pakistan .....             | 9.9                               | 1.8                          | 1.3   | 0.6                          |

Source: (38).

## CHAPTER VII.--LAND RESOURCE DEVELOPMENT

Development of the land base is one of the measures involved in increasing output of the agricultural sector. This facilitates other factors, such as increased use of fertilizers and other inputs; improved organization and management; and shifting of use patterns to higher value crops: and it often makes them possible. For purposes of this review, land development will be discussed in four categories -- area of cropland, irrigation, land reform, and consolidation. These are not mutually exclusive: irrigation or drainage adds cropland more often than not; land reform that reduces large estates to numerous small farms intensifies land use; and consolidation converts access routes and borders to active cropland use.

### Increasing Cropland

We have shown in chapter III that the area of cropland increased very slowly from 1948 to 1965, with most of the increase after 1957. Greece has limited cropland area, and it is used relatively intensively. Presumably for centuries, population pressure has been heavy on land that was feasible for development with existing technology, except on large estates where access was denied and use was not intensive. Sparse records and tradition indicate that the mountains in Greece were mostly forested at one time. Except in rough and inaccessible areas, the forests have long been cleared for crops and pastures. Therefore, after World War II, positive measures were necessary if the area of cropland was to be expanded.

The general term for this process is land reclamation. Land is made available for cropping through clearing, drainage, irrigation, desalination, flood protection, and other means, or combinations of them. The combinations lead to much confusion in interpreting the data.

### Initial Efforts

Cropland during the 20 years before World War II increased by about 15,780,000 stremmas, approximately doubling. Of this, 29 percent resulted from direct Government investment in drainage and other water or reclamation projects. Seventy-one percent resulted from direct investment by farm people, mainly their own labor (3). This 20-year period began at about the time of the last major land addition to modern Greece -- in 1922, Greek Thrace was ceded by treaty.

The land reclamation program was started in 1926. Its main objective was to provide landless Asia Minor refugees with land. Early work was carried out by American companies (26). By 1939, 120,000 hectares had been protected against floods and 100,000 hectares had been reclaimed (67). Most work was on the plains of Thessaly, Thessaloniki, Serres, Drama, and Arta. The object was to provide cropland area for subsistence-type farming; drainage and clearing of level lowlands was relatively quick and low-cost.

One advantage of this type of land reclamation was that the production from land with superior potential, such as rich bottom lands, could be realized. For example, the Meric-Evros River Project brought lands into production that were suited to rice, yielding 3,000 kilos per hectare, compared with the national average of 2,020 kilograms per hectare in 1935-38; 2,436 in 1948; and 2,810 in 1949. Barley yielded 2,300 kilos per hectare in 1951, compared with the national average of 1,100 (55 and 60).

By 1952, land development agencies were operating on a large scale within the Ministries of Public Works and Agriculture. Trained technicians and heavy machinery were available. Some weaknesses existed in administrative organization, such as in the interdepartmental efforts needed to carry out maintenance work on major projects (12).

By far the largest increase of land area in field crops occurred from 1947-49 to 1952-54, averaging 3.5 percent per year. The rate then declined, and from 1961-63 to 1965-67, field-crop area decreased slightly. Early increases were due mainly to (1) the drainage of lakes and swamps; (2) the cultivation of former fallow land, made possible in large part by flood control and drainage; and (3) the emphasis on increasing wheat output. Flood protection provided the most land, irrigation was second (table 35). As a result of these works, an area of 5 million stremmas of land was benefited. This amount was almost one-fourth of the field-crop area in 1935-38.

Table 35.--Land reclamation, end of World War II  
through June 1953

| Type of land reclamation | Area                 |
|--------------------------|----------------------|
|                          | ----- Stremmas ----- |
| Drainage .....           | 380,399              |
| Desalinization .....     | 505,850              |
| Clearing .....           | 273,159              |
| Flood protection .....   | <u>1/</u> 3,000,000  |
| Irrigation:              |                      |
| Gravity .....            | 548,341              |
| Wells .....              | 1,881,762            |

1/ An approximation: The figure was reported as more than 2,996,655 stremmas.

Source: (19).

In the early 1950's, it was estimated that only 75 to 80 percent of the possibly cultivable land in northern Greece was in production (27). The use made of community pastures was considered uneconomic -- if cultivated, they would be much more productive. From 1950 to 1965, the highest average annual compound rates of growth in cultivated area were 1.9 and 2.7 percent in Macedonia and Thrace, respectively. During this period, these northern regions showed increases of 32.9 and 50.1 percent, respectively, over one-half the total increase in cultivated area. Emphasis on increasing the supply of land has been a major characteristic of public investment policy in Greek agriculture until recently.

Total cost of land improvement projects entirely financed by the State after World War II and until the end of 1958 was 1,500 million drachmas. Increase in gross agricultural product brought about by large-scale and minor projects executed was estimated at 4 billion to 5 billion drachmas a year, or about 16 percent of average annual agricultural production in 1957-59 (67). Additional improvements were possible. FAO reported that some 500 watersheds needed correction for soil and water conservation. It was estimated that annual damage of crops from flooding was 750 million drachmas, or about 2.7 percent of average annual agricultural production in 1957-59 (39). Better farm management alone could not eliminate this loss. Need for further land improvement was recognized by the Government -- public investment increased considerably during 1958-66.



In 1966, total expenditures for irrigation and drainage, excluding administration costs, were 1,225 million drachmas (992.25 million in 1958 prices) (33). Of the total, 792 million was expended by the Ministry of Public Works and 433 million by the Ministry of Agriculture. Work accomplished included construction of new irrigation networks on 100,000 stremmas, improvement of drainage of 100,000 stremmas, and leveling within irrigation networks on 87,000 stremmas. More irrigation came from surface water, as the proportion from pumping was believed to have declined from the 62 percent estimated for 1965.

### Irrigation

As pointed out above, irrigation is a form of land reclamation that either increases the area of cropland or improves the present area. Available data do not differentiate between the two. The main reason the separation is made here is that irrigation is an engine of development permitting and facilitating many activities -- application of most advanced technologies, obtaining high rates of other inputs, production of new crops, double cropping, and others. For example, it was estimated in the late 1950's that if high-yielding cotton replaced wheat, both gross and net income per land unit could be increased 3 to 3-1/2 times (39). A country increasing irrigation has a decided opportunity to bring about growth of the agricultural sector, as well as general development.

Since rainfall in most areas of Greece is limited to a short period of the year and precipitation is low, irrigation is widely needed. In the Thessaloniki area of Macedonia, annual precipitation of 22 inches is distributed unfavorably for all late-summer crops, such as corn, cotton, and potatoes (27). Most of it falls between September and March, with only local showers or none at other times. Without irrigation, fields devoted to winter cereal crops are left fallow following harvest; they bake in the sun and hot wind and are subject to erosion. Ideally, irrigation development has the single objective of irrigation, but it requires related flood control and drainage measures (60).

### Increases in Irrigated Areas

The first program of large irrigation projects was drafted in 1949. In the early 1950's, area under irrigation was increased, partly through bank loans to individual farmers or to village cooperatives and partly by direct Government construction (16). Major schemes in 1957 accounted for 47,877 hectares of irrigated land, or only about 12 percent of the total irrigated area, but the anticipated irrigated area of these projects was 408,646 hectares. According to the FAO Mediterranean Project Report, the increase in irrigated areas in the years just prior to 1959 was "due largely to the extension of small, cheap, easily installed systems of less than 100 hectares which at present (1957) account for 80 percent of the irrigated area" (39). A law of October 1958 stipulated that State grants could reach 100 percent of expenditure for projects of "major" interest (up to 50 percent for irrigation projects) and 40 percent for projects of local interest. The beneficiaries were to reimburse the State for any amounts not covered by grants, in 15 to 30 annual installments bearing no interest (67).

Only about one-fourth of the area of projects under construction in 1965 was actually irrigated, and less than one-half was expected to be irrigated by 1970 (table 36). The Axios-Aliakmon irrigation project (the Thessaloniki Plain) is by far the largest. Items in the table under the heading "area expected for completed projects" emphasize the problem of relating various land development activities to area. Whether all land to be drained, protected from flooding, and reclaimed (undefined) would be irrigated is not clear. The Evros flood control project is an illustration. The Evros River is the boundary between Greek and Turkish Thrace. Flood control, drainage, and

Table 36.--Selected land development projects under construction in 1965 and new, 1966-70: total expected irrigated area, 1966-70; area irrigated in 1965; and number of farms estimated for the area

| Land development projects     | Area expected for completed projects |          |               |             | Irrigated area       |                   | Farms estimated for the area |
|-------------------------------|--------------------------------------|----------|---------------|-------------|----------------------|-------------------|------------------------------|
|                               | Irrigation                           | Drainage | Flood control | Reclamation | 1965                 | Expected, 1966-70 |                              |
|                               | ----- 1,000 streammas -----          |          |               |             | -----                |                   | Number                       |
| Under construction, 1965:     |                                      |          |               |             |                      |                   |                              |
| Achelooos Plain .....         | 350                                  | 150      | 200           | 30          | 130                  | 150               | 14,500                       |
| Evros Flood Control .....     | 0                                    | 250      | 300           | 130         | 0                    | 0                 | 6,000                        |
| Axios-Aliakmon Irrigation ..  | <u>1/644</u>                         | 600      | 100           | 200         | 400                  | 200               | 27,200                       |
| Nestos Irrigation .....       | 350                                  | 50       | 0             | 20          | 10                   | 200               | 8,000                        |
| Peneios of Elia Irrigation .. | 260                                  | 15       | 120           | 20          | <u>2/25</u>          | 105               | 10,600                       |
| Tavropos of Karditsa          |                                      |          |               |             |                      |                   |                              |
| Irrigation .....              | 144                                  | 100      | 0             | 0           | 2                    | 100               | 4,200                        |
| Alpheios Irrigation .....     | 140                                  | 110      | 0             | 45          | 5                    | 22                | 5,000                        |
| Irrigation Network of         |                                      |          |               |             |                      |                   |                              |
| Serres .....                  | 60                                   | 0        | 0             | 0           | 0                    | 5                 | 1,000                        |
| Total, 26 projects .....      | 2,531                                | 2,176    | 1,252         | 536         | <u>2/(68)630</u>     | 1,082             | 115,100                      |
| New, 1966-70:                 |                                      |          |               |             |                      |                   |                              |
| Evros Plain Development ..... | 325                                  | 70       | 0             | 70          | NA                   | 130               |                              |
| Xanthi-Komotini Plains Dev... | 150                                  | 0        | 0             | 0           | NA                   | 0                 |                              |
| Drama Plain Development ..... | 178                                  | 0        | 0             | 0           | NA                   | <u>2/(10)45</u>   |                              |
| Kopais Plain Irrigation ..... | 180                                  | 50       | 0             | 0           | NA                   | <u>2/(10)10</u>   |                              |
| Arta Plain Irrigation .....   | 100                                  | 130      | 0             | 10          | NA                   | 10                |                              |
| Argos Plain Irrigation .....  | 220                                  | 0        | 0             | 0           | NA                   | 32                |                              |
| Korintha Plain Irrigation ..  | 120                                  | 0        | 0             | 0           | NA                   | 0                 |                              |
| Messara Plain Development ..  | 230                                  | 0        | 0             | 0           | NA                   | 0                 |                              |
| Total, 29 projects .....      | 2,251                                | 490      | 67            | 98          | NA <u>2/(115)424</u> |                   |                              |

1/ In the source, this figure was given as 1,644 streammas -- apparently in error by 1,000. The adjustment agrees with the column total and text.

2/ Presently privately or partially irrigated and to be improved.

Note: NA means not available.

Source: (62).

reclamation was done unilaterally to attain immediate development of the plain on the Greek side of the river. By 1968, an agreement had been reached with Turkey for joint development of the installations required to irrigate both sides -- 325,000 stremmas in Greece, as shown in the table under the new projects. The area already partially developed is probably within the area to be irrigated.

New irrigation projects almost equal, in area to be irrigated, those projects in process. Slightly more than one-fifth of this new area was expected to be irrigated by 1970. The amount of drainage and the other practices required for projects under construction indicates that river plains and lakes and swamps predominate, while different types of development appear to be required for new projects. Costs for projects in process are estimated at about 5,630 drachmas per stremma (\$752 per acre), and costs for new projects at 4,870 drachmas (\$648 per acre). One conclusion from table 36 is that the Government has started and partially developed many projects but has completed few of them.

### The Recent Pattern in Crop Irrigation

Crops with 80 percent or more of their area irrigated in 1962 were rice and the major commercial vegetables. By 1967, 80 percent or more of the sugar beet and cotton areas were irrigated; other major field crops with relatively high percentages of area irrigated at that time were alfalfa, 60 percent, and corn, 51 percent.

### Productivity and Irrigation

Two of three principal crops showing large increases in yields from 1962-64 to 1965-67 also showed large increases in percentage of cropland irrigated from 1962 to 1967. Cotton yields increased from 1.235 to 1.721 metric tons per hectare, or at a compound annual rate of 11.7 percent, while the proportion of cotton acreage irrigated increased by 16 percent. Corn yields increased from 1.656 metric tons per hectare to 2.243 metric tons, or at a compound annual rate of 10.6 percent, while the proportion of corn acreage irrigated increased by 13 percent. Major producing regions varied in area of corn irrigated from 15 percent in Thrace to 67 percent in Epirus. Regional differences in annual percentage increases in corn yields from 1962-64 to 1965-67 showed a relationship, significant at the 0.1 level, to regional variation in the percentage of cornland irrigated in 1966. Barley yields increased at a 10.6-percent average annual rate during the 6-year period, but irrigation was not an important factor.

No significance was found in the regional variation of the annual increase in value of crop production per stremma from 1952-54 to 1965-67 and the annual increase in irrigated area from 1950 to 1965. One explanation is that two of the three regions with large increases in irrigated area -- that is, Thrace and Macedonia (table 37) -- also had the largest increases in cropland area. No significance was found between regional variation in value of crop output per stremma of cropland in 1965-67 and percentage of crop area irrigated in 1965. This is explained in part by the variation among regions of the relative importance of livestock in total output.

### Land Reform

Extensive land reform had been completed for most regions during the late 1920's. A 1923 law provided for expropriation from foreigners of all agricultural properties for the benefit of the nation's farmers, and owners were to be compensated with 6-percent bonds redeemable in 30 years (34). Between 1917 and 1932, more than 300,000 landless and refugee farm families were settled on alienated large estates, public lands, and lands recovered through public land reclamation (mainly clearing and drainage). Lots

Table 37.--Cultivated land irrigated and growth rate, by region, 1950-65

| Region               | Cultivated land irrigated |         |           |         | Annual growth rate, 1950-65 |
|----------------------|---------------------------|---------|-----------|---------|-----------------------------|
|                      | 1950                      |         | 1965      |         |                             |
|                      | Stremmas                  | Percent | Stremmas  | Percent | Percent                     |
| Peloponnesus .....   | 612,195                   | 11.2    | 1,128,584 | 16.9    | 4.2                         |
| Central Greece ..... | 660,352                   | 12.2    | 1,182,786 | 20.3    | 4.0                         |
| Thessaly .....       | 221,737                   | 5.1     | 664,713   | 13.6    | 7.6                         |
| Epirus .....         | 170,643                   | 15.4    | 314,738   | 25.2    | 4.2                         |
| Macedonia .....      | 451,003                   | 5.9     | 1,713,883 | 17.0    | 6.6                         |
| Thrace .....         | 14,040                    | 0.8     | 95,804    | 3.5     | 13.7                        |
| Aegean Islands ..... | 113,662                   | 6.3     | 227,151   | 12.4    | 4.7                         |
| Crete .....          | 155,571                   | 6.9     | 318,129   | 11.3    | 4.9                         |
| Ionian Islands ..... | 18,546                    | 2.6     | 39,338    | 5.2     | 5.1                         |
| Total .....          | 2,417,749                 | 7.9     | 5,685,126 | 15.4    | 5.9                         |

Source: (56).

varied from 10 to 100 stremmas (32). Land area included in these reforms accounted for 36.2 percent of the total cropland farmed in 1939; settled farm families totaled 1.5 million in population; and their farms equaled one-third of the total number of operating farm units in 1929 (25).

In 1952, when a provision limited individual landholdings to 300 stremmas, approximately 6 million stremmas from larger holdings were available for expropriation, one-third of it, church property (32). About 65,000 families were landless after World War II, and there were about 200,000 inadequately sized holdings. The 6 million stremmas from larger holdings equaled about 22.5 stremmas each for the 265,000 families. However, only about an estimated 2 million stremmas were effective in serving these objectives. Many landholders are believed to have retained effective control by lodging title in the hands of friends or relatives who would not in fact exercise rights or be expected to discharge obligations of ownership.

Area distributed went to 130,000 families, mostly to enlarge small holdings (66). By 1960, it was reported that all possibilities of compulsory acquisition had been exhausted; the only source of land left to the State for enlarging small holdings was new lands to be developed under large-scale projects. The standard of reform established in 1952 has been maintained at 300 stremmas per holding.

#### Consolidation

Consolidation of farm plots is a slow process, as is common with most changes in institutions. The 1929 census showed that the average owner-operated farm consisted of five or six noncontiguous plots of land of 3 to 4 stremmas in area. We have seen that in 1961 the average number of parcels was about seven, and this had not decreased appreciably by 1967.



Before World War II, the Government could do little about parcelling except preventing division of State-distributed land; this restriction apparently applied only until obligations of the purchase were met. Fragmentation by dowry and inheritance divisions were not restricted. In 1948 and 1949, consolidation was required of large holdings that were expropriated for land distribution purposes.

The 1952 Constitution extended the 1948 and 1949 laws and allowed consolidation of extremely fragmented holdings. The goal was consolidation of farms into one, or, under some conditions, two or three plots. Legislation was permissive -- "voluntary consolidation" -- and was based on three principles:

- 1.--"Spontaneous" expression by landowners to the Ministry of Agriculture of the intent to undertake consolidation within a "commune," or village. This required affirmation by more than 50 percent of the landowners whose property exceeded 50 percent of the area to be consolidated.
- 2.--Creation of farms of one plot (not more than three) equal in value to the aggregate of more numerous plots owned before consolidation. This required topographic mapping, cadastral survey, and title abstract, as well as appraisal by a committee from the commune.
- 3.--Providing field-access facilities (24, p. 213 ff.)

Details included educational activities in advance of the request for consolidation; establishment of the action committee that included Government technicians; provision for review of the appraisal and consolidation plan; and allocation of plots.

Meanwhile, irrigation development was a major program publicly supported. Systems to distribute water to fragmented holdings were almost impossible to arrange physically, and entirely so, economically. Fragmentation also prevented the mechanization and other technology required to realize fully the gains in productivity that irrigation made possible. In 1958, legislation was enacted providing for "involuntary" consolidation within project areas. The extent of investment by the Government in project development provided the leverage necessary to effect consolidation.

Up to 1967, the voluntary program accounted for the largest area, and this was true even after 1959 (table 38). Total area consolidated was only 6.5 percent of the 35,589,000 stremmas reported in parcels in 1961, or about 16 percent of the area for which consolidation was believed to be needed. The number of villages (communes) involved was 6.2 percent of the total in Greece. In its early stages, consolidation was carried out principally in Central Greece, Thessaly, and Macedonia.

Direct costs of 63.7 drachmas per stremma were estimated in 1963 and 41.0 drachmas in 1965. Other costs, including services of Ministry officials, could be as much as 80 drachmas. Road construction, if undertaken, would be on the order of 72 drachmas. None of these are direct costs to the farmer. Benefits were estimated to be as much as 115 drachmas per stremma per year. Of course, consolidation alone does not generate these benefits, but it does permit improved farming practices and greater efficiency (62).

Refragmentation was not prevented; consolidation is a continuing process. Plans in 1968 called for a rate of consolidation about equal to irrigation expansion for a few years, while a greatly accelerated program was being developed.

Table 38.--Progress of land consolidation, 1953-67

| Year        | Voluntary       |               | Involuntary <sup>1/</sup> |               | Total           |               |
|-------------|-----------------|---------------|---------------------------|---------------|-----------------|---------------|
|             | Area            | Villages      | Area                      | Villages      | Area            | Villages      |
|             | <u>Stremmas</u> | <u>Number</u> | <u>Stremmas</u>           | <u>Number</u> | <u>Stremmas</u> | <u>Number</u> |
| 1953 .....  | 20,137          | 4             |                           |               | 20,137          | 4             |
| 1954 .....  | 38,075          | 6             |                           |               | 38,075          | 6             |
| 1955 .....  | 34,403          | 6             |                           |               | 34,403          | 6             |
| 1956 .....  | 80,613          | 10            |                           |               | 80,613          | 10            |
| 1957 .....  | 41,586          | 6             |                           |               | 41,586          | 6             |
| 1958 .....  | 66,477          | 6             |                           |               | 66,477          | 6             |
| 1959 .....  | 41,263          | 5             | 24,572                    | 4             | 65,835          | 9             |
| 1960 .....  | 82,104          | 14            | 99,661                    | 18            | 181,765         | 32            |
| 1961 .....  | 88,460          | 13            | 87,647                    | 11            | 176,107         | 24            |
| 1962 .....  | 91,763          | 14            | 105,311                   | 34            | 197,074         | 48            |
| 1963 .....  | 116,450         | 20            | 151,642                   | 25            | 268,092         | 45            |
| 1964 .....  | 175,620         | 25            | 114,751                   | 30            | 290,371         | 55            |
| 1965 .....  | 203,450         | 21            | 180,057                   | 30            | 383,507         | 51            |
| 1966 .....  | 174,600         | 24            | 125,140                   | 16            | 299,740         | 40            |
| 1967 .....  | 150,900         | 23            | 30,665                    | 8             | 181,565         | 31            |
| Total ..... | 1,405,901       | 197           | 919,446                   | 176           | 2,325,347       | 373           |

<sup>1/</sup> Not in effect before 1959.

Source: (33 and 52).

## CHAPTER VIII.--EXTERNAL ASSISTANCE

Rate and direction of growth and development of the Greek economy since World War II have been influenced materially by external support in the form of technical assistance, investment capital, training, grants for specific purposes, commodities, and military aid. These were provided first by Britain and the United Nations Relief and Rehabilitation Administration (UNRRA), followed by three different programs of the United States -- AID and its predecessor agencies, the P.L. 480 commodities program, and military assistance. These efforts were supplemented by a number of other sources from time to time, usually on an individual project basis, and were more or less co-ordinated within the continuing development framework.

### Before World War II

Greece has long been the recipient of foreign assistance. The foreign debt, not including postwar debts, totaled about 205 million pounds in 1956, or, at 1956 conversion rates, \$575 million. However, because of difficulties with exchange rates, "the total amount of foreign public debt outstanding has been variously estimated at between \$250 million and \$600 million . . .". These debts were in gold francs, pounds, dollars, Canadian dollars, French francs, Reichsmarks, Bulgarian leva, Turkish pounds of gold and paper, and drachmas (14, app. V). They included bonded and unbonded loans, intergovernmental loans, war debts, and other items.

Greece had difficulty before World War II in servicing her foreign debt. F.C. Mason noted partial default in 1932 and suspension of payments in 1941 (14, p. 9). Even under partial default, servicing cost \$12 million in 1938. Practically no debt servicing was resumed until 1955, when a small start was made after negotiation of more favorable terms with foreign bondholders.

By 1966, Greek external prewar debts to America, England, and France had been settled through negotiation, leaving outstanding nominal capital on bonded debt:

|                          | <u>Dollars</u>   |
|--------------------------|------------------|
| America (3 loans) .....  | 35,800,000       |
| England (14 loans) ..... | 153,193,054      |
| France (2 loans) .....   | <u>1,609,109</u> |
|                          | 190,642,163      |

In addition, prewar intergovernmental debts were settled leaving balances of \$13,155,921 for one U.S. loan, and 14,990,375 new French francs for three loans from France.

The first loan specifically identified was a bonded debt in 1833 guaranteed by France, together with England and Russia. This was made just 3 years after Greece attained independence, when the country was little more than the Peloponnesus and Central Greece. The use was not specified. France guaranteed a similar loan in 1898 and granted one to the then autonomous Crete in 1902. In 1893, two French loans financed the Salonica-Istanbul and Salonica-Monastir railways. Greece had also contracted to pay 8-1/2 percent -- based on land area acquired -- of the old Ottoman public debt.

While the intended use of loan funds was not consistently given, Forster reports a series of loans, beginning in 1927, that were for specific projects (7). In 1927, a loan of £2,500,000 was received from the United States for refugee settlement. In the same year, the League of Nations assisted Greece in obtaining £9 million for (a) refugee settlement, (b) liquidation of the deficit, and (c) stabilization of the currency. By 1930, when the Refugee Settlement Commission of 1923 was disestablished, almost one million refugees had been settled in Greece at a cost of nearly £80 million.

Development projects were initiated. In 1930, the Government was authorized to borrow £8 million for road construction and drainage. In the same year, a British firm contracted to carry out land reclamation and irrigation at a cost of £6,500,000. In 1932, a loan of £4,600,000 was used for public works including road construction and drainage operations in the Vardar and Struma Valleys. In 1937, more than £2 million was loaned by a British firm for drainage and irrigation in Thessaly, land reclamation and flood protection in Epirus, and other work in Crete.

Another loan agreement was concluded with the German Government in 1937 in the amount of 350 million drachmas to meet armament requirements and complete the defense program.

#### 1945-49

The 1945-49 period was critical in Greek history. Greece emerged from World War II facing starvation, divided politically, and with its productive capacity largely destroyed and completely disorganized. Problems of the period were providing basic subsistence, organizing politically, and restoring productive capacity. The political problem was resolved largely by military means, as far as external economic support is concerned. This is reported as a separate assistance item. It is extraneous to this report except to note that part of the monetary value of military assistance was an input to the total economy, and to a considerable extent, it released Greek resources for other purposes. Problems of subsistence and of rebuilding the economy were resolved with economic aid. Sources and volume of this aid are shown in table 39. During this same period, military aid totaled about \$560 million.

According to Forster, when Greece was liberated, immediate relief was provided by the British Military Liaison until UNRRA took over (7, p. 227 ff.). UNRRA imported 2,667,500 tons of food up to June 30, 1947. The U.S. attitude had been that Greece was Britain's concern, and thus, the United States was not involved in these first years, beyond providing about 70 percent of total financing of UNRRA. However, it became clear that Greece needed large-scale assistance to become a viable State. This was beyond the means of Britain, and it notified the United States that its economic commitments in Greece must end on March 31, 1947. The U.S. Congress provided \$300 million for Greece, of which \$150 million was economic aid and \$150 million, military aid. In 1948, economic commitments were transferred under the Marshall Plan to the Economic Cooperation Administration (ECA). British contributions were reported by Forster at about \$344 million.

The ECA report attributed to the UNRRA (1) shipments of seeds, equipment, and fertilizer that "restored the cereal harvests in 1946 to virtually prewar levels;" (2) imports of feed, raw cotton, machinery, and other requirements that assisted in the recovery of industrial output in 1946 to 65 percent of its prewar levels; (3) some work in restoring the Peloponnesian and Thracian railways; and (4) initiation of a health program. In addition, UNRRA supplied direct food relief (35). In 1947, apparently, almost the entire program of reconstruction was assumed by the United States.

The American Mission for Aid to Greece and ECA had committed about \$50 million in grant funds through 1948, with more than half for transportation and communications, \$13 million for agricultural rehabilitation, and the remainder for industry, mining, water and power development, and housing. Counterpart funds were being developed that were to be available to pay for the Greek materials and labor needed for reconstruction, development, and Mission expenses. However, large amounts of these were frozen from time to time to protect the currency.

The statistical listing of the public debt of Greece shows a loan from the Export-Import Bank of \$25 million in 1946 (55, Table XX, p. 331). It is probably the \$15 million credit shown in table 39 as the amount disbursed by 1949.



Table 39.--Foreign economic aid to Greece, January 1945-July 1949

| Source   | Amount                           |
|--|----------------------------------|
|  | <u>Million dollars</u> <u>1/</u> |
| Lend-lease .....   | <u>2/50</u>                      |
| United Nations Relief and Rehabilitation<br>Administration (UNRRA) ..... | 415                              |
| British aid .....  | 140                              |
| Canadian post-UNRRA aid to Greece .....                                  | 5                                |
| Export-Import Bank credit .....  | 15                               |
| OFLC loans <u>3/</u> .....   | 80                               |
| U.S. Maritime Commission credit .....                                    | 45                               |
| American Military aid to Greece <u>3/</u> .....                          | 128                              |
| Economic Cooperation Administration .....                                | 263                              |
| Public Law 84 .....  | 40                               |
| Private relief organizations .....                                       | <u>17</u>                        |
| Total .....  | 1,198                            |

1/ Equivalents.

2/ Minimum estimate of economic aid (nonmilitary).

3/ Amounts authorized.

Source: (35).

Through June 1949, these external assistance programs had been emergency in nature, concerned with meeting elemental requirements for sustenance of the people, reestablishing refugees in their villages (many of which had been destroyed), restoring agricultural production, reestablishing transportation and communications, and rebuilding the small Greek industry. Early in 1949, the Mission and the Greek Government began to look ahead in terms of a long-range program for a viable Greek economy based on development of latent resources.

#### 1949-66

The program proposal for fiscal year 1950 presented a long-term program (35, p. 28 ff.). "A long-term economic program for Greece must embrace plans for economic development. Mere reconstruction of the prewar economy would be an inadequate objective." It was submitted as a 4-year program, but with a qualification: "Above all it is necessary to recognize frankly that reconstruction and development may have to continue beyond 1952 . . ." (35, p. 34). In 1966, the economic assistance program ended with investment of over \$1.4 billion after 1949. (Military assistance is not included in this amount.)

## The 1949 Proposal

General objectives were to improve living conditions and the balance of payments through increasing and diversifying exports and through import substitution. Foreign exchange costs were estimated by the Mission at \$545.8 million, of which \$203 million would come from reparations, repatriation of Greek foreign assets, hoarded gold, sterling balances, and private foreign investment. The balance of \$243 million "has been assumed by the Greek Government . . . [and] would be furnished through ECA allotments." Internal costs were estimated at \$600 million equivalent.

The agricultural program can be summarized as follows: (1) Use of water control and irrigation to open additional land; (2) technical services to make better use of the soil; (3) education of farmers in crop rotation and the best uses of feed, fertilizer, and equipment; (4) application of mechanical equipment to appropriate areas such as the plains of Macedonia; (5) limiting erosion; and (6) introduction of modern equipment and application of the extension program to reduce the loss of citrus fruits and vegetables that was due to the lack of suitable storage and processing facilities.

The "hope" of the long-term plan was to increase output by as much as 40 percent above the 1948-49 level of \$600 million, when agricultural imports were about \$115 million. "Greece produces less food per man, per acre, and per animal than almost any of the participating countries of the ERP" -- European Recovery Plan. "The United States Department of Agriculture is participating fully . . .".

The program emphasized water as the most important undeveloped resource, as a substitute in part for almost complete dependence for energy on imports of petroleum and coal. Five sites for dams were under consideration, with the goal of producing 365,000 kilowatts. Associated with this objective was reclamation for agricultural purposes, protection of 232,000 hectares from floods, drainage of 100,000 additional hectares, and irrigation of 75,000.

Other development objectives involved lignite, mining, industry, transportation, telecommunications, tourism, public health, refugee rehabilitation, and housing.

## 1949-54

Despite previous planning, the long-term development program was evolving from 1949 to 1955. This period was characterized by economic assistance in the form of grants; neither development lending under the Mutual Security Act (MSA) nor generation under P.L. 480 of local currency for lending purposes, were in effect. The amounts of the Marshall Plan and MSA grants to Greece during the period are shown in table 40. The yearly differences between values in the first and last columns arise because funds were committed in the year shown in the first column, while actual disbursement was made as shown in the last column. The lag could occur with grant, loan, or commodity programs. Over time, the two series tended to equate.

The amount of \$32.0 million reported as obligated for April-June 1948 represents an annual rate of \$128 million. Even higher rates of assistance continued through 1952, after which they dropped sharply, reaching a low of \$20.9 million in 1954. Why this rapid decline occurred is not clear, beyond the fact that the Marshall Plan period in which European recovery was emphasized had ended, and the program under the Mutual Security Act was more in the formative than the action stage. The low level of obligations in 1954 was offset by total expenditures of \$60 million, in large part on the basis of previous obligations.

The pattern of assistance financing for Greece during 1949-54 is similar to that for Western Europe generally, when the economies were being rebuilt under the Marshall

Table 40.--AID and predecessor agency program financing, annual summaries, 1948-67

| Authorization and<br>U.S. fiscal year | Net obligations and loan<br>authorizations |                 |           | Total<br>expenditures |
|---------------------------------------|--|-----------------|-----------|-----------------------|
|                                       | Total                                      | Loans <u>1/</u> | Grants    |                       |
|                                       | ----- Million dollars -----                |                 |           |                       |
| Marshall Plan:                        |  |                 |           |                       |
| 1948 (Apr.-June) .....                | 32.0                                       | ---             | 32.0      | 11.5                  |
| 1949 .....                            | 161.8                                      | ---             | 161.8     | 113.2                 |
| 1950 .....                            | 177.1                                      | ---             | 177.1     | 126.0                 |
| 1951 .....                            | 156.5                                      | ---             | 156.5     | 139.3                 |
| 1952 .....                            | 179.3                                      | ---             | 179.3     | 198.5                 |
| Mutual Security Act:                  |  |                 |           |                       |
| 1953 .....                            | 81.1                                       | ---             | 81.1      | 109.0                 |
| 1954 .....                            | 20.9                                       | ---             | 20.9      | 60.0                  |
| Apr. 1948-June 1954 .....             | 808.7                                      | ---             | 808.7     | 757.5                 |
| 1955 .....                            | 33.9                                       | 10.0            | 23.9      | 59.9                  |
| 1956 .....                            | 26.6                                       | 15.0            | 11.6      | 45.7                  |
| 1957 .....                            | 25.5                                       | 10.0            | 15.5      | 28.8                  |
| 1958 .....                            | 27.7                                       | 12.0            | 15.7      | 4.6                   |
| 1959 .....                            | 20.7                                       | <u>2/</u>       | 20.7      | 20.0                  |
| 1960 .....                            | 56.6                                       | 31.0            | 25.6      | 30.2                  |
| 1961 .....                            | 20.4                                       | <u>2/</u>       | 20.4      | 23.3                  |
| AID:                                  |  |                 |           |                       |
| 1962 .....                            | 30.3                                       | 10.0            | 20.3      | 13.7                  |
| 1963 .....                            | 31.5                                       | 31.6            | -0.1      | 17.8                  |
| 1964 .....                            | 7.8  | 7.7             | 0.1       | 31.3                  |
| 1965 .....                            | -9.9                                       | -9.9            | <u>2/</u> | 16.8                  |
| 1966 .....                            | -18.4                                      | -18.4           | <u>2/</u> | 4.1                   |
| 1967 .....                            | <u>2/</u>                                  | <u>2/</u>       | <u>2/</u> | 1.6                   |
| July 1954-June 1967 .....             | 252.7                                      | 99.0            | 153.7     | 297.8                 |
| Total assistance .....                | 1,061.4                                    | 99.0            | 962.4     | 1,055.3               |
| Principal repayments .....            |  | 10.3            |           |                       |
| Interest collected .....              |  | 18.1            |           |                       |

1/ Program began in 1955.

2/ Less than \$50,000.

Source: (31, p. 16).

Plan and the Mutual Security Act. Agricultural commodities, as well as construction materials and industrial and communications equipment, were supplied under the grant program, and these generated counterpart funds that were available to the Greek Government to finance its own labor and materials contributions and to support its financial structure.

The use made of assistance grants during this period was not always clear. According to Psilos and Westebbe, of the gross investment financed by U.S. aid from July 1948 through June 1953, 11.2 percent was for agriculture and 10.0 percent for land reclamation (21). Up to 1952, agricultural development efforts were mainly in land reclamation, flood protection, irrigation works, and pasture improvement. After fiscal year 1952-53, the emphasis of the American Mission and the Greek Government in agricultural development shifted to problems of improving management programs, improving marketing and distribution facilities, further exploiting forest resources, and reorganizing the agricultural credit system.

The Mechanical Cultivation Service (MCS) had a major role in projects that yielded high returns. MCS received a large amount of U.S. aid for equipping itself, financing operations, and obtaining technical advice. Its main area of activity, as pointed out earlier, has been in land improvement, and it has also helped construct rural roads. UNRRA was first engaged in this activity, as exemplified by one 20-mile road that enabled a village to market grapes by truck -- construction of this road led to a 50-percent increase in cropland. From 1948 to the mid-1950's, MCS, with U.S. aid, built some 6,000 miles of roads -- it "sold" roads to the villagers (17). These roads not only provided access to markets but increased the mobility of people between the villages and the cities and towns.

While the Greek engineers and agriculturalists understood land reclamation, they lacked sources of capital to carry it out. During 1948-53, development of land and water resources required 50 percent of the American aid that was allocated for resource development; and 10 percent of the gross investment financed by aid during this period was used for land reclamation (19).

Table 41 shows distribution of direct and counterpart funding according to type of land development activity. About 45 larger and 256 smaller land development projects were in progress by the end of 1951 (12). By 1952, land development agencies had been organized on a larger scale than before World War II within the Ministries of Public Works and Agriculture (17). Technicians had been trained, and \$12 million of heavy earthmoving equipment was available. Early in the 1950's, the U.S. Congress directed the Mutual Security Agency to give first priority to those projects that directly aided NATO defenses. This decision meant termination of direct assistance to many projects. The American Mission recommended that smaller projects be undertaken.

An example of a medium-sized project was that for alkali, under which highly productive land was developed for rice production. Total costs were \$495 per hectare, supported by \$4 million of aid. One report indicated yields up to 9.9 tons of paddy rice per hectare, and the average was over 3.5 tons. The Agricultural Bank financed many small projects with loans of 3 to 5 years, with farmers doing much of the work. U.S. aid for these projects averaged about \$500,000 per year from 1948 to 1953. "Increases in production (up to about 1954) are largely attributed to the . . . work done for the development of land resources. This . . . American economic assistance . . . was the major 'success' factor for the . . . rehabilitation of Greece's agricultural economy . . ." (19).

U.S. aid for development of marketing services was limited to general infrastructural roadbuilding. In 1951, an agreement was made for a "ration reserve." The United States was to provide \$25 million in foodstuffs, such as wheat, coffee, sugar, dried fish, and so on (12). Counterpart funds were to be used to erect olive oil storage



Table 41.--Land development expenditures, 1948-53

| Purpose                                    | Expenditures               |
|--|----------------------------|
|  | <u>Dollars</u>             |
| Direct funding:                            |                            |
| Reclamation .....                          | 15,822,623                 |
| Reclamation of alkali soil .....           | 423,217                    |
| Mechanical cultivation service (MCS) ..... | 14,111,545                 |
| MCS workshops .....                        | <u>567,031</u>             |
| Total .....                                | <u>1/30,924,416</u>        |
|  | <u>Million drachmas 2/</u> |
| Counterpart funding:                       |                            |
| Reclamation .....                          | 567.7                      |
| Reclamation of alkali soil .....           | 65.8                       |
| Small reclamation .....                    | 25.7                       |
| Breaking up and brush clearing .....       | 27.7                       |
| MCS workshops .....                        | <u>7.4</u>                 |
| Total .....                                | <u>3/694.3</u>             |

1/ American Mission for Aid to Greece, Economic Cooperation Administration, Mutual Security Act, and Foreign Operations Administration. 11.4 percent of total nonmilitary aid was from the United States.

2/ New drachmas, converted from old drachmas shown in source table.

3/ Counterpart expenditures, all sources. 9.58 percent of total nonmilitary aid was from the United States.

Source: (19, p. 37).

tanks, grain silos, and other storage facilities for food. Greeks were permitted to purchase about 60 percent of their basic requirements in these foods at fixed prices. Thus, a design was created to stabilize the entire food price structure.

#### 1955-66

Fiscal year 1955 brought two major changes in U.S. assistance programs. The first was the addition of capital assistance in the form of loans in the Mutual Security Act program. During the MSA period, loans to Greece were repayable in drachmas, with provisions for maintenance of value (MOV). The loan program continued through the AID period, but loans made then were repayable in dollars.

The second change was the application of the P.L. 480 program, mentioned earlier, which made surplus commodities available under a variety of "titles" in the act. Most important for the development program was Title I. This provided that a large part of local currencies generated by sale of the commodities would be available for loans to the Government to finance development projects that had been agreed on. Before 1959, these loans carried MOV provisions, later they did not. The "Cooley amendment" provided for loans without MOV to private enterprise.

Thus, the Mutual Security-AID program continued after 1955 with both grant and loan components (table 40). During this period, the grant component exceeded the loan component by about 50 percent. In 1964 and 1965, some loan commitments were deobligated -- presumably because Greece was able to carry on the projects covered by the loans without this support. The annual progress of the P.L. 480 program will be reviewed in a later section. The pattern of assistance in this period was atypical. Few countries that had heavy assistance in the early 1950's received much later. On the other hand, the program in most of Africa and Latin America started about 1955 and reached its peak about 1960.

Of the Mutual Security-AID and P.L. 480-Title I loan programs, the first group, repayable in dollars, comprised four AID loans agreed on in 1962, 1963, and 1964 (table 42). One loan financed the Development Bank, one was a program loan, and two were for the Kastraki Dam and Hydroelectric Project. The next group included four P.L. 480 local currency loans and five under pre-AID programs. Two of the latter were for specific projects -- a fertilizer plant and the Kremasta Hydroelectric Project. The others were all "project assistance." The third group was made up of three project assistance loans and two that were termed "economic development" loans. Finally, there were 17 Cooley loans to private industry for specific business enterprises, providing construction funds or working capital. Two of these were related to cotton processing, while one for poultry-raising facilities was definitely agricultural.

The loan programs generated agreements totaling \$162.9 million, most of which was disbursed. Over 10 percent was repaid, and interest collections to 1968 were more than double the repayments of principal. Preponderance of the terms "project assistance" and "economic development" conceals the uses made of most of the loan funds; hence, the extent to which they were used to support development of the agricultural sector.

Literature on the development history of Greece is not particularly specific in tying projects to assistance sources, nor does it emphasize the timing of events in the 1955-66 period as it had done earlier. As a further complication of the problem, sources discussing the same subject rarely agree on data, for such reasons as time period differences, currency conversion rates, definitions, authorization vs. disbursement, and many others. However, mention of some major areas of activity will indicate the scale and direction of support provided at various times.

The Agricultural Bank received major support from outside sources. Counterpart funds in an amount equivalent to \$3,600,000 were provided for the bank by American aid during the Marshall Plan period. This was for both short- and long-term lending. In 1960, the bank's capital was only 480 million drachmas. Of the total loans outstanding of about 8.5 billion drachmas, 5.7 billion were covered by central bank credit with the Bank of Greece. Later, 1.8 billion drachmas (about \$60 million) of blocked counterpart funds were turned over to the Agricultural Bank as permanent capital, and the United States asked for reforms in credit policies and operations. The funds were to be released over a 5-year period, to be used as a revolving fund for medium- and long-term loans (21). From October 1944 through June 1964, some \$117 million in direct and counterpart assistance were supplied to the Agricultural Bank, principally for capitalization.

Training outside of Greece, supported by the United States, included 754 trained in that country and 20 in third countries. The largest number, 180, were trained in agriculture, many for the Agricultural Extension Division in "one of the most successful U.S. aided programs in Greece" (30). A weakness was the lack of trainees (only 56) from industry, especially in management.

Munkman reported that before World War II, the American Near East Foundation and the Ministry of Agriculture took initial steps in the development of extension. Later,

Table 42.--Summary of status of loan agreements reported by AID, March 31, 1968

| Type of loan  | Agreement<br>amount | Loan dis-<br>bursement | Principal<br>repay-<br>ments | Exchange<br>rate<br>adjust-<br>ments | Balance<br>out-<br>standing | Interest<br>col-<br>lections |
|---|---------------------|------------------------|------------------------------|--------------------------------------|-----------------------------|------------------------------|
|   |                     |                        |                              | 1,000 dollars 1/                     |                             |                              |
| Repayable in dollars ...                            | 20,995              | 17,229                 | 0                            | ---                                  | 17,229                      | 1,200                        |
| Repayable in local<br>currency with MOV 2/ ..       | 114,290             | 113,219                | 13,407                       | ---                                  | 99,812                      | 29,872                       |
| Repayable in local cur-<br>rency without MOV 2/ ..  | 17,991              | 17,991                 | 127                          | 40                                   | 17,903                      | 3,319                        |
| Cooley loans, local cur-<br>rency without MOV 2/ .. | 9,627               | 9,143                  | 3,979                        | ---                                  | 5,164                       | 1,658                        |
| Total .....   | 162,903             | 157,582                | 17,514                       | 40                                   | 140,108                     | 36,049                       |

1/ Dollar equivalents for loans repayable in local currency.

2/ MOV -- maintenance of value.

Source: (29).

American aid contributed to making the organization operational. There was no lack of trained agriculturalists with degrees from the Agricultural College of Athens or the University of Thessaloniki, but rather a lack of organization and extension technique. American county agents reoriented the staff of the Extension Division. In 1951, aid made demonstration plots possible in 100 villages. In 1953, farmers interviewed in 100 villages said they had learned much from the Extension Division, but had not applied it all. Some 15,000 demonstration plots for forage crops served to introduce new varieties in 1953 and 1954. Almost 500 rural youth clubs were established by 1956. Problems of grading and marketing had not been touched by the time the program was cut back after 1955 (17).

The same author states that nearly \$1 million was invested in research and other "institutes." Wheat strains and other crop varieties were introduced, as reported in chapter V. The Seed Production Service was established with \$1.5 million of U.S. aid. In 1948, the United States and the Ministry of Agriculture initiated the program of livestock development, including an artificial insemination program with 16 stations. Veterinarian clinics were set up in provincial centers. The number of these clinics was limited by a shortage of trained veterinarians willing to live in the villages (1).

The technical assistance program was being phased out by 1961, with some projects not complete -- especially those in farming methods. Technology was still behind that of most developed countries, but generally the program was termed "effective."

U.S. assistance contributed to expansion of the physical plant for education. Nearly 1,000 school rooms were built and 3,800 repaired. The program included aid for the American College in Athens, for setting up a Veterinarian College in the University of Thessaloniki, and for the American Farm School near Thessaloniki. The latter was established in 1902 and has been privately supported by Americans. It maintains an enrollment of 170 boys in crafts and farming methods; these boys return to their villages



and extend their influence in modernizing agriculture. It has also served as a model for similar schools in Greece and elsewhere, and it is a regional center for agricultural activities.

The United States assisted in the development of facilities to produce modern inputs, especially fertilizers. First was a project loan in 1958 of \$11.9 million, repayable in drachmas, to finance foreign exchange costs of the Ptolemais nitrogen fertilizer plant. By 1963-64, Greece began producing nitrogenous fertilizers on a continuous basis. However, other sources than the United States provided the major support for fertilizer production development.

### The P.L. 480 Program

We have noted above several aspects of the P.L. 480 program, particularly in relation to development funding and the loan program included in the values of U.S. assistance reported in table 40. In this section, the focus is on the program itself, and its part in development of the Greek economy. A detailed study of the program was made by the Center of Planning and Economic Research, covering the period 1955-62; thus, only major findings from that study will be summarized here (4, especially ch.12, p. 261 ff.). The Center study presents some basic time series data on the program, other assistance, and related items. These data do not agree in detail with other sources, such as those used for tables 43 and 44. The differences are not large, and they do not affect conclusions reached by Coutsoumaris and the other authors. They do not reflect real differences in data -- only differences in timing, definition, and sources.

The value of annual exports of commodities under the several titles of P.L. 480 and other commodity programs is shown in table 43. Title I, the principal component from the development point of view, was explained earlier. Emergency relief was insignificant. Title III has two parts. The first was for donations through voluntary relief agencies and international organizations, with school lunch and other child-feeding programs as major uses. After 1964, voluntary agencies emphasized self-help projects supported by commodities under Title III, rather than continued relief in chronic situations that had shown no improvement. Barter, the other part of Title III, provided for use of commodities to procure goods and services for U.S. Government agencies and for stockpiling. Title IV, added in 1959, provided for long-term dollar credit sales (for a fuller summary of the program under P.L. 480, see 5). From 1955 through 1957, commodities under the Mutual Security Act continued to be important in Greece. These shipments were an extension of earlier assistance, and they were continued to maintain "normal commercial imports," a prerequisite to receiving Title I commodities.

Coutsoumaris and others point out the fortuitous coincidence of the beginning of the P.L. 480 program in Greece with two other events. Other U.S. economic aid programs in Greece had been reduced sharply and resource scarcity was becoming a major obstacle to economic growth, while financial stability had been achieved; thus, balance-of-payments considerations were not an important limiting factor. The contributions the P.L. 480 program could make suited Greece very well. The P.L. 480 program, especially Title I, was limited only by the capacity of the economy to absorb surplus commodities.

Title I agreements through 1959 contributed mainly wheat, and, to a lesser extent, other foodstuffs. This wheat, with supplies under section 402 of P.L. 665 (MSA), made up the deficiency in Greek output. It did not interfere with domestic production, but filled the gap while domestic output was being built up. The American wheat was imported by the Government and sold at the higher support price for domestic wheat. An important foreign exchange saving was achieved, and the Government budget benefited by the price differential -- from 1955 to 1962, the Government paid 3.11 million drachmas for Title I commodities and realized 3.75 million (4, p. 161). In effect, the balance helped to finance the price-support program.



Table 43.--U.S. agricultural exports to Greece under specified U.S. Government-financed programs, 1955-66

| Year<br>ending<br>June 30   | Public Law 480 program                         |                                    |                      |            |   | Mutual<br>Security<br>Act and<br>AID<br>programs | Total<br>program<br>exports |
|-----------------------------|--|------------------------------------|----------------------|------------|---|--|-----------------------------|
|                             | Title I --<br>sales for<br>foreign<br>currency | Title II --<br>emergency<br>relief | Title III            |            | Title IV --<br>long-term<br>supply and<br>dollar<br>credit<br>sales <u>1/</u> |  |                             |
|                             |  |                                    | Foreign<br>donations | Barter     |   |  |                             |
|                             |  |                                    |                      |            |   |  |                             |
| ----- Million dollars ----- |  |                                    |                      |            |   |  |                             |
| 1955 .....                  | 0  | 0                                  | 8.5                  | 11.0       | ---   | 24.3   | 43.8                        |
| 1956 .....                  | 12.4   | 0                                  | 14.4                 | 0.2        | ---   | 24.0   | 51.0                        |
| 1957 .....                  | 28.3   | 0                                  | 10.4                 | 0.4        | ---   | 28.0   | 67.1                        |
| 1958 .....                  | 9.3  | 0                                  | 9.4                  | 0.1        | ---   | 2.6  | 21.4                        |
| 1959 .....                  | 8.7  | 0                                  | 7.3                  | <u>2/</u>  | ---   | 0.6  | 16.6                        |
| 1960 .....                  | 4.0  | 0                                  | 5.1                  | <u>2/</u>  | ---   | 0.6  | 9.7                         |
| 1961 .....                  | 14.0   | 1.4                                | 5.5                  | <u>2/</u>  | ---   | 1.3  | 22.2                        |
| 1962 .....                  | 11.3   | 0                                  | 6.5                  | <u>2/</u>  | ---   | 0.1  | 17.9                        |
| 1963 .....                  | 8.4  | 0                                  | 5.1                  | <u>2/</u>  | ---   | 0.7  | 14.2                        |
| 1964 .....                  | 15.0   | 0                                  | 5.3                  | <u>0.5</u> | ---   | <u>2/</u>  | 20.8                        |
| 1965 .....                  | 7.4  | <u>2/</u>                          | 3.8                  | 3.4        | 14.0  | <u>2/</u>  | 28.6                        |
| 1966 .....                  | 0  | <u>2/</u>                          | 3.3                  | 4.5        | 9.5   | <u>0</u>   | 17.3                        |
| Total ..                    | 118.8  | 1.4                                | 84.6                 | 20.1       | 23.5  | 82.2   | 330.6                       |

<sup>1/</sup> Program began in 1965.

<sup>2/</sup> Less than 0.05 million dollars.

Source: (5, table 10, p. 93).

After 1959, increased importation of P.L. 480 feed grains stimulated the relatively stagnant livestock industry. (This occurred at approximately the time that increasing output from sheep and cattle was becoming independent of growth in numbers, and productivity was becoming dominant -- figs. 11 and 12.) Domestic production of these grains may have been limited to some extent, because imported ones were sold near cost. However, adverse effects on production were, without doubt, more than offset; for the first time, large quantities of feed grains were provided on the market, which stimulated a demand on the part of the livestock industry. Without these supplies, which created the demand, comparable quantities would not have been used. We have seen, since Coutsoumaris wrote, that feed grains have become an important import item, and that domestic production of grains and forages has grown rapidly.

Title III programs administered by American volunteer agencies were concentrated at first on improving diets of a large part of the rural population that lived close to the subsistence level. The scale of this exceeded imports the Greek Government alone might have made for the same purpose. For a time, the program was overexpanded, reaching beyond those seriously in need. By 1962, a new program was in effect, in which the voluntary agencies and the Greek and American governments cooperated in a free-lunch program for 600,000 schoolchildren in small towns and villages.

A feature of Title I important to Greece was the provision for returning a part of the sales proceeds to the Greek investment and defense budgets. This feature competed with the U.S. interest in financing as many as possible of its local costs from locally generated currency. Every drachma retained avoided the necessity for using appropriated dollar currency. As a result, the P.L. 480 program made a smaller contribution to economic development than it might have. From 1952 through 1962, local currency turned over to Greece as either grants or section 104g long-term loans was 58.5 percent of proceeds, while the October 1963 agreement provided 45 percent. U.S. uses in all countries were averaging 30 percent. Grants of local currencies to meet NATO commitments to Greece reduced amounts available for development loans. From the point of view of the Greek Government, Cooley loans were a form of U.S. use, because these funds went mainly to private U.S. enterprises and had no effect on the Greek budget. These funds represented only about 10 percent of the sales proceeds, but did contribute to the economic and technical efficiency of the enterprises they supported.

Funds transferred to official sources in Greece were important to the Government's financial policy. From 1957 through 1963, these constituted 5.8 percent of the total investment budget, and 17.3 percent of budget receipts from foreign sources. Most of the funds were used for productive infrastructure investments. The P.L. 480 program permitted the Government to carry out a larger noninflationary investment-spending program than it could have otherwise, and sales at prices above cost left a margin useful for price support on a noninflationary basis. When amortization payments begin on section 104g loans, they will constitute a serious burden on the current budget by reducing surplus available for investments.

#### External Assistance and the National Economy

Aside from specific goals of the components of the total assistance programs -- technical assistance, training, grants, program or project loans, and commodities -- assistance programs were significant in their total impact on the economy simply as additional resources. In the first 4 years, 1949-52, total assistance averaged almost 10 percent of GDP, and it continued to average about 3 percent through 1957 (table 44). The sheer scale of these resources had a major effect on the viability of the economy, especially in the early years when they, plus counterpart funding, made up the major portion of total investment. The level of assistance averaged nearer 1 percent after 1957, and internal saving became more important. At this level, effects of assistance depended much more on its specific application to programs and projects especially critical to the stimulation of growth and development.

External resources contributed materially to investment in Greece over time (fig. 20). In 1948, internal disinvestment occurred, more than offset by external resources. After that, internal saving remained positive and grew rapidly except in 1952, 1954, and 1960, and it first became the dominant source in 1953. After 1956, external assistance was consistently less than the total contribution of external corporate and private investment to domestic asset formation, and it was generally very much less.

Table 44.--Gross domestic product (GDP) of Greece, U.S. assistance, and other major lending, 1949-66

| Year        | GDP of<br>Greece      | U.S. assistance       |                      | Loans,<br>other<br>sources | Total assistance      |                      |
|-------------|-----------------------|-----------------------|----------------------|----------------------------|-----------------------|----------------------|
|             |                       | Amount                | Percentage<br>of GDP |                            | Amount                | Percentage<br>of GDP |
|             |                       |                       |                      |                            |                       |                      |
|             | Million<br>dollars 1/ | Million<br>dollars 2/ | Percent              | Million<br>dollars 3/      | Million<br>dollars 3/ | Percent              |
| 1949 .....  | 1,758.4               | 143.1                 | 8.1                  | None                       | 143.1                 | 8.1                  |
| 1950 .....  | 1,764.8               | 157.1                 | 8.9                  | None                       | 157.1                 | 8.9                  |
| 1951 .....  | 1,904.6               | 162.7                 | 8.5                  | 32.5                       | 195.2                 | 10.2                 |
| 1952 .....  | 1,902.2               | 226.9                 | 11.9                 | None                       | 226.9                 | 11.9                 |
| 1953 .....  | 2,149.0               | 123.4                 | 5.7                  | None                       | 123.4                 | 5.7                  |
| 1954 .....  | 2,211.4               | 67.0                  | 3.0                  | None                       | 67.0                  | 3.0                  |
| 1955 .....  | 2,361.7               | 87.3                  | 3.7                  | None                       | 87.3                  | 3.7                  |
| 1956 .....  | 2,504.2               | 77.3                  | 3.1                  | None                       | 77.3                  | 3.1                  |
| 1957 .....  | 2,696.1               | 69.6                  | 2.6                  | 9.0                        | 78.6                  | 2.9                  |
| 1958 .....  | 2,765.2               | 23.4                  | 0.8                  | None                       | 23.4                  | 0.8                  |
| 1959 .....  | 2,883.4               | 35.4                  | 1.2                  | 1.5                        | 36.9                  | 1.3                  |
| 1960 .....  | 2,962.0               | 38.0                  | 1.3                  | None                       | 38.0                  | 1.3                  |
| 1961 .....  | 3,281.5               | 43.3                  | 1.3                  | 1.0                        | 44.3                  | 1.3                  |
| 1962 .....  | 3,366.0               | 29.8                  | 0.9                  | None                       | 29.8                  | 0.9                  |
| 1963 .....  | 3,626.8               | 29.2                  | 0.8                  | 8.6                        | 37.8                  | 1.0                  |
| 1964 .....  | 3,936.4               | 47.9                  | 1.2                  | None                       | 47.9                  | 1.2                  |
| 1965 .....  | 4,228.4               | 40.9                  | 1.0                  | 20.8                       | 61.7                  | 1.5                  |
| 1966 .....  | 4,527.4               | 18.8                  | 0.4                  | 10.6                       | 29.4                  | 0.6                  |
| Total ..... | 50,829.0              | 1,421.1               | 2.8                  | 84.0                       | 1,505.1               | 3.0                  |

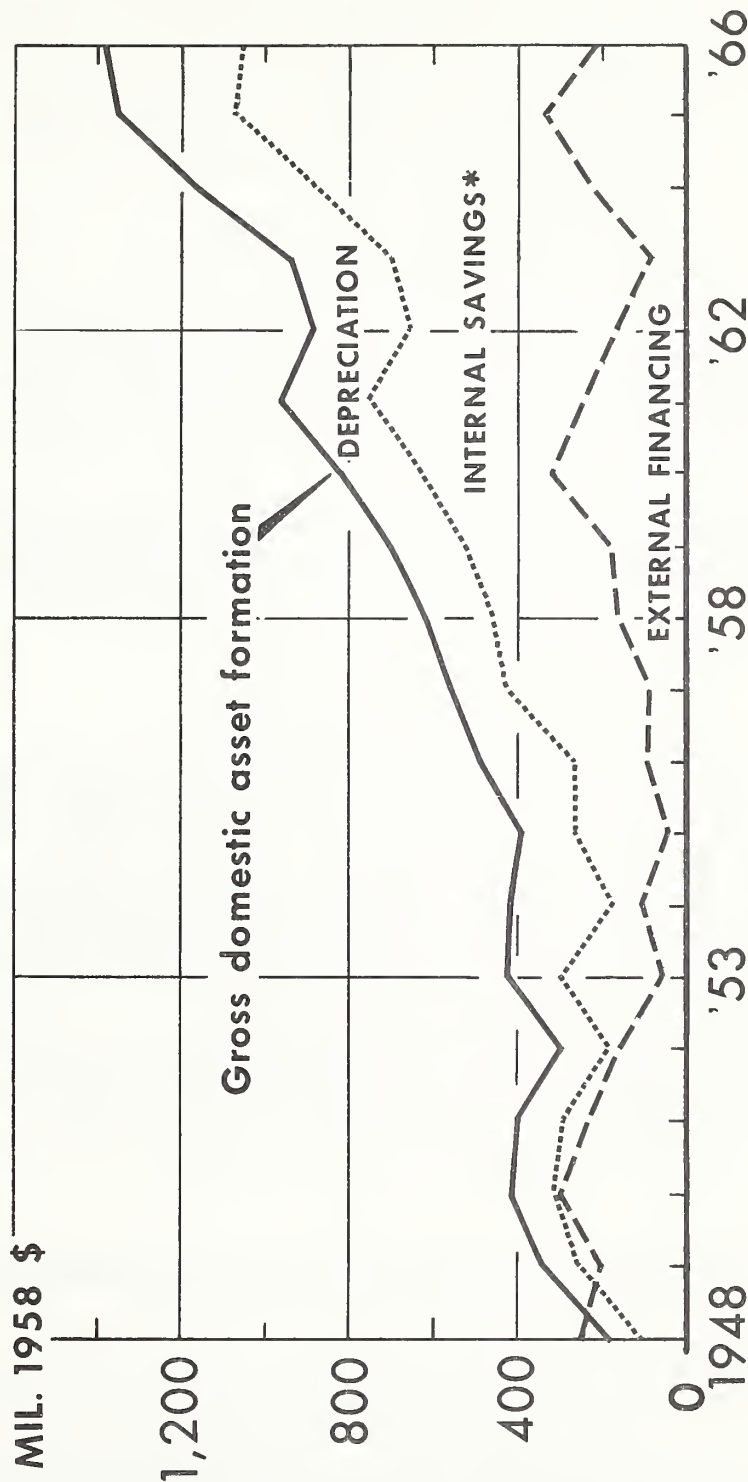
1/ Based on constant 1958 drachmas, converted at the rate of 30 drachmas per dollar.

2/ Successively, these were Marshall Plan, Mutual Security Act, and AID, plus P.L. 480 after 1955. Series has been adjusted to 1958 dollars using total gross national product implicit deflator.

3/ Adjusted to 1958 dollars -- see footnote 2.

Source: GDP from (44) and (45); U.S. assistance from table 9; and other lending from (55).

# COMPONENTS OF GROSS DOMESTIC ASSET FORMATION, GREECE



\*NEGATIVE IN 1948.

ANALYSIS BASED ON TIMESPANS OF UNEQUAL LENGTH.

U.S. DEPARTMENT OF AGRICULTURE

NEG. ERS 7773-70 (10) ECONOMIC RESEARCH SERVICE

Figure 20



## CHAPTER IX.--THE 5-YEAR PLAN

Late in 1967, Greece produced a 5-year development plan. This states the basic objectives of development policy; presents plans by sector in general terms; gives the field of State activity and the sectoral structural changes planned; and projects the internal and external balance of the economy. This overall plan is the principal basis for the summary, paraphrasing, and quotations that follow. In 1968, a detailed plan for agriculture was published, which quantifies the overall plan for the agricultural sector and underlines policy and program requirements (51 and 59).

### Basic Objectives

The 5-year plan lists a series of long-term goals: (1) High level of per capita income (\$1,000 by 1972); (2) improved group and regional income distribution; (3) full employment and equal opportunity; (4) greater competitiveness of the economy and adaptation to the EEC; (5) improvement of the balance of payments and reduction of external dependence; (6) higher standards of social services; and (7) proper regional distribution of productive activities and population.

Three of the major "intermediate goals" for 1968-72 are to attain an average annual rate of growth between 7.5 and 8.5 percent; to change the composition of production, investment, and the balance of payments; and to create 350,000 new employment opportunities, increasing total employment by 190,000 persons and transferring 160,000 from low- to high-productivity occupations. Of the total, 110,000 are expected to be drawn from the agricultural sector.

### Agricultural Plan

While it recognizes increases in sector production in recent years, the 5-year plan says that little progress has been made in correcting the following basic structural weaknesses: (1) a high percentage of low-yield crops with income and price elasticities of demand both low; (2) livestock production that is a small percentage of agricultural production; (3) only 13 percent of the cultivated land used for "dynamic" crops, such as vegetables, citrus and fresh fruits, and cotton; and (4) low yields in terms of area and number of workers. Half the labor force is in agriculture and it produces one-fourth the national output.

Targets are 5.2-percent growth in GAP, compared with 4.5-percent growth from 1961-62 to 1966-67. Targets are 7.6 percent for livestock and 4.7 percent for crops. The share of livestock output would increase from 30 percent in 1965 to 35 percent in 1972.

### Increase in Productivity

Output per person employed is expected to increase at a rate of 6.5 percent (it was 4.0 percent from 1948-50 to 1964-66), as the result of several lines of effort:

- 1.--Improvement of size, structure, and efficiency of agricultural holdings will be accomplished through creation of an active land market supported by credit, and possibly by cooperative farming, and a greatly accelerated program of consolidation supported by control of refragmentation.
- 2.--Mechanization is to increase 70 percent through training of farmers, technical support, financial incentives and subsidies, and cooperative ownership.

- 3.--Land reclamation will include increasing the area of irrigated land by 1,850,000 stremmas and increasing the proportion of cropland irrigated from between 16 and 17 percent to 20.4 percent. Both extensive projects and smaller, less expensive, private projects will be used. Public investment is planned at 11.5 billion drachmas and subsidies will be provided for private development.
- 4.--Use of improved technology will be expanded and will include improving varieties of crops, trees, and animals, more rational use of fertilizers and pesticides, and mechanization to facilitate technological change.
- 5.--Training and agricultural extension will be expanded through (a) the Agricultural Extension Division and centers for farm training, (b) reorganization of agricultural education at university and lower levels, and (c) reorganization and modernization of research.
- 6.--Regional structure of agriculture will be developed "according to the comparative advantage of each region," to be aided by (a) the new minimum intervention support prices that allow prices a freer role in allocating agricultural resources and (b) an Extension Division program.
- 7.--Intensive agricultural investment will be made in areas that are irrigable and in areas with fertile soils. At the same time, mountainous and barren soils will be shifted to more extensive uses, which will actually reduce total cropland.

#### Developing Markets

Projected increases in per capita incomes will increase domestic demand for agricultural products. However, absorbing the planned growth of agricultural production will require positive programs for import substitution and expansion of exports.

Structure of production.--This will be adjusted toward commodities for which Greece has a comparative advantage and demand is active domestically and abroad. The growing demand for animal-derived foods calls for rates of increase in meat at 9.4 percent; eggs, 8.0 percent; and dairy products, 5.5 percent. The share of meat imported is to be reduced from 30 percent in 1966 to 5 percent, and the dairy share from 10 percent to practically nothing. These goals will require increased emphasis on feed crops. Also, shifts will be made to crops whose demand will increase as incomes do -- citrus, other fruits, vegetables, cotton, and sugar beets. Export crops to be developed further include citrus, other fruits, vegetables, table grapes, cotton, and others, as well as expansion of "traditional" exports. To accomplish these aims will require a complete restructuring of the price-support, subsidy, and income-transfer systems.

Harmonization with the EEC.--This will be accelerated. Full advantage will be taken of opportunities for exports and for financing of sector structural changes through the EEC.

Marketing information and development.--The target here is for market information and development that is particularly oriented to exports. The plan calls for creation of a special bureau in the Ministry of Agriculture, strengthening the services in the Ministry of Commerce, and sending trade delegations abroad to promote market research and to advertise Greek products.

Marketing.--This is to be organized more efficiently to increase exports and meet the demand of domestic consumers. Infrastructure is emphasized -- construction of facilities for storage and for grading, processing, and packing, and improvement of cold storage and refrigerated transportation equipment. To expand exports, the Government will introduce grades and standards and strict quality control, and apply them to internal supplies as this becomes feasible.

#### Farm Labor Force and Income

The goal is to use the agricultural labor force more efficiently and to increase its productivity through accelerated development of the sector and reduction of numbers employed. Special training programs are to be established for farmers moving out of agriculture. Objectives intended to level out labor needs and alleviate underemployment include: (1) achieving a rational distribution of production; (2) increasing livestock production; (3) mechanizing the harvest; (4) transferring peak-season labor interregionally; and (4) providing for seasonal public works projects.

Increases in labor productivity, which will close the gap between rural and urban incomes, are expected to occur at an annual rate of 6.5 percent. This depends on improved organization of resources and methods of using them, and on higher levels of technology. These measures will be supplemented by income transfers and improved social services.

#### Institutions and Organizations

The plan provides for major changes in the structure of the agricultural sector's institutional framework.

The credit system.--The system will be modernized and extended, particularly through reorganization of the Agricultural Bank:

- 1.--Credit policy will be used more effectively in restructuring agriculture.
- 2.--The ratio of intermediate and long-term credit will be increased above the present 18 percent. This will facilitate land purchase, mechanization, and other investments.
- 3.--Short-term credit will be based purely on economic criteria, free of political and social objectives and related to the financial condition of individual farms.
- 4.--Special credit privileges for cooperative industries will be abolished, and lending will be based entirely on efficiency criteria. Officials will consider transferring to private entrepreneurs those processing industries owned wholly or partially by the State or the bank.
- 5.--Administrative costs of the bank will be reduced. Its technical services will be merged with those of the Extension Division; the distribution of supplies will be gradually abandoned; and the supervisory authority over cooperatives will be transferred to another agency.

Cooperatives.--These will be organized to compete on equal terms with "private enterprise" in the business field and to "eliminate weaknesses and operations deficiencies of small holdings." Present weaknesses include small size and resultant lack of management; limited cooperative education; lack of cooperative spirit; undue intervention by the bank; and concentration of cooperative activities in credit rather than in production, processing, and marketing. Proposals include: (1) revision of legislation, supporting the combination of locals into larger units, and clarification of supervisory responsibilities over cooperatives; (2) establishment of special training schools for cooperative employees, and (3) revision of the credit system to improve efficiency of cooperatives.

State agricultural services.--These services, particularly the regional branches of the Ministry, will be reorganized to increase their effectiveness in carrying out development policy. The Extension Division, Land Reclamation Service, and research institutes and stations will be expanded. Agronomists will be relieved from clerical duties, and additional scientific personnel will be added to the Extension Service and will be supplied with transport equipment.

Development of livestock breeding.--This will be given special attention because of its importance in the overall production targets of the plan; and the necessary organizational preconditions will be created. To complement the general measures described above, the specific proposals are: (1) importing a "considerable number" of high-quality calves to improve livestock; (2) establishing in all livestock areas the units for livestock improvement, including artificial insemination stations; (3) expanding production and improving marketing of livestock feeds; (4) establishing organized livestock markets; (5) establishing slaughterhouses and dairies and organizing meat and dairy product marketing; (6) improving veterinary services and improving the organization of breeding research, training, and extension services; and (7) importing foreign investment capital and "know-how" to establish large, modern breeding units.

#### Other Relevant Plans

The agricultural sector must look to adjustments in other sectors of the economy for amelioration of two persistent problems. The first of these is providing economic opportunity for the excess population in agriculture. We have noted earlier that 110,000 of the new employment opportunities to be generated during the plan period are to be filled from the agricultural sector. This is analyzed in detail in the plan in terms of the labor force, employment, and productivity (59, p. 200 ff.).

Some of the plan's projections are: (1) a population growth rate of 0.6 percent, reflecting a declining birth rate, slightly rising death rate, and net emigration at 17,000 per year; and (2) an annual increase in the labor force of 0.6 percent (natural increase at 0.9 percent partially offset by annual emigration of 10,000 of the labor force). Hence, of the 8-percentage-point rate of economic expansion, less than 1 point will depend on increased employment and over 7 points on increased productivity of the labor force. Of the projected 320 billion-drachma investment over the plan period, about 12 percent would be required to attain full employment at the present level of productivity, and 88 percent to increase productivity, including labor transfer from low- to high-productivity sectors. Underemployment in agriculture is expected to be reduced by planned readjustment of crop structure, with emphasis on labor-intensive crops and reduction in seasonal variations in employment, plus increased supplemental employment in tourism, light industry, and public works.

The contribution of labor productivity is expected to be particularly significant in agriculture, manufacturing, mining, public utilities, transport, and communica-



tions -- those sectors principally involved in exports. Productivity in agriculture is expected to increase at a rate of 6.5 percent, compared with the nonagricultural sectors at 6 percent. For industry, the rate is projected at 8.8 percent, contrasted with both construction and services at 3.9 percent each. Agriculture will benefit from a 1.2-percent rate of decrease in employment, resulting in reduction in participation in the sector from 50.1 percent in 1967 to 44.7 percent in 1972.

The second problem for the agricultural sector relates to the limited land market, caused at least in part by nonfarm ownership of land as a status symbol. This inhibits efforts to enlarge and consolidate holdings in the interests of efficiency. This may well be, as a reasonable hypothesis, a situation in which fairly high levels of income are generating savings without providing opportunities for investment. Other evidences of this hypothesis are the concern expressed in official circles over the strong balance of private investment in housing and other consumption goods rather than in production and in the immediate oversubscription of a large securities offering by the semipublic power corporation in 1968. The typical family-business industrial organization does not provide an effective outlet for general investment of private savings. The overall plan points to enabling laws of 1967 aimed at improvement of the capital position of firms by strengthening the institution of the incorporated company, broadening existing "entrepreneurial" capacity, and creating necessary preconditions for a sound capital market.

## CHAPTER X.--RELEVANCE OF THE GREEK EXPERIENCE

The agricultural sector contributed positively in the ways needed to support the growth of a developing nation. Its rate of growth was sufficient to provide for population; to partially accomodate the quantity and quality increases in demand that arise from growing incomes; to accomplish considerable import substitution; and to provide exports of agricultural commodities that have increased more than their imports.

The institutional structure and policies and programs that operated through it comprised a package approach to development, even though it functioned imperfectly in some aspects. It has been supported by large-scale and long-term external technical and capital assistance.

The approach to development of the agricultural sector in Greece is not necessarily directly transferrable to other countries, but much of the experience has general relevance, as do its weaknesses. A combination of characteristics favored development, including the low rate of population growth; a relatively stable Government that supported agricultural development; strong external assistance; homogenous population; and a strong national spirit with determination to progress.

### New Technology

Development requires a supply of new technology, distribution of information about it to potential users, and their comprehension and use of it.

### Source

Before World War II, crops research concentrated on adaptive research; and the staff was upgraded through specialized training. Later research was extended to the more basic approach of developing Greek varieties from indigenous and imported genetic materials. Quick returns of adaptive research were exploited first; and later, the more sophisticated research needed to protect these gains and exploit maximum genetic potentials was undertaken.

Development of the livestock industry, in terms of adapted advanced technology, did not keep pace with growth of the economy. Early concern was with basic nutrition in the form of cereals and direct-consumption items. Small farms were not conducive to efficient dairy and beef production. The high income elasticity of demand for foods of animal origin was not anticipated. Experience in Greece and other developing nations demonstrates that this latent demand will emerge when per capita incomes grow.

Equipment for mechanization was imported. It is much less specific to the environment than crops are; therefore, more transferrable. Production of farm equipment requires a large-scale manufacturing industry. The small farms of Greece require a substantial proportion of garden tractors. These are now being manufactured in Greece, but some components are imported.

### Dissemination

The extension function was lodged in two institutions -- the Extension Division in the Ministry of Agriculture and the Technical Service Division of the Agricultural Bank. The Extension Division was hampered by a staff overburdened with the administration of several action programs. Salaries were low, and transportation lacking. The technicians of the bank were involved in what approached being a supervised credit system, but about all they were able to do was to allocate the fertilizer supply as an

adjunct to individual loans. These activities were supplemented by those of the Mechanical Cultivation Service and several strong commodity groups, such as those in cotton and tobacco. The effect was dispersion of the farmer's attention and inefficient and weakened general extension.

On the other hand, the Extension Division did have a "program." Extension divisions often lack programs; and institution building, such as organizing an extension service, is overemphasized at the expense of operations.

Some focal point was needed where farmers could discuss their problems and solutions, and where the Extension Division and those responsible for development and operation of programs could work with local groups. The cooperative system might have provided this, but the local cooperatives generally served only as agencies for the Agricultural Bank, and no effective alternatives were developed. Despite these apparent weaknesses in means of dissemination, technology was adopted at a fairly high rate.

### Comprehension

A high level of literacy helped in the assimilation of technology. In 1961, literacy in rural areas was 76.1 percent, compared with the national average of 82.2 percent. This level assured the presence of individuals in practically every village who would be reached through mass media. Scientific and administrative leadership was provided by an adequate supply of persons educated at the university level, but it was hampered by overemphasis on classical education rather than in specialized fields, such as agriculture. For priority subjects, advanced training in the United States and other countries was undertaken on a substantial scale. The great shortage persisted in persons trained in agriculture at the level of the technical schools -- persons who were needed for supporting staff throughout agricultural production, processing, and marketing, and the supporting public and private institutions.

### The Economic Environment

The economic environment was manipulated to stimulate growth, encourage structural change, support sectoral incomes, improve distribution of income, and for other purposes. This was based on the premise that farmers were or could be economically motivated. In some other developing countries, more so than in Greece, behavior is governed by a pattern of social mores with binding custom and tradition, and with orientation to a subsistence-type of agriculture. In these cases, the economic forces characteristic of a market economy are not effective until some demand is generated that can be satisfied only through the monetary system.

### The EEC

After 1962, Greece benefited from associate membership in the European Economic Community. Already favored by geographic proximity and established transportation routes to western and central Europe, Greece gained easy entry and somewhat improved terms of trade. Turkey has enjoyed a similar arrangement almost as long as Greece has. More recently, 18 developing countries of northern Africa were granted special trade concessions; and decisions for other countries are pending. Thus, the tie to the EEC is shared by a significant number of developing countries that compete in supplying the same commodities.

## Prices, Bonuses, and Subsidies

Commodity prices were used freely in Greece to encourage production of certain crops. For example, wheat prices were relatively high early in the development period, when the objective was self-sufficiency. When this level was surpassed, the price was adjusted downward. Price levels were flexible and did not become institutionalized at the higher levels. Citrus for export was sold at world market prices, with the Government paying the difference between prices received and the guaranteed price. Bonuses have been used to accomplish more specific objectives: for cotton grown on irrigated land -- shifting the production area; for beets harvested mechanically -- encouraging mechanization; and for beef animals marketed over a specified weight -- gaining more production from their existing numbers.

The wheat case is especially relevant for other developing countries. To replace wheat imports with domestic production, the Government set the support price substantially above the world price. The support levels were reflected in prices to consumers, which enabled the Government to finance the program by income transfers from consumers to producers. However, when surpluses that had to be exported were generated, the Government found itself saving the differences between support prices and world prices for the amount exported. Thus, it immediately adjusted wheat prices downward, and farmers responded by reducing acreage planted. Price structures must remain flexible so that governments can make the needed adjustments.

Developing countries have to follow a narrow margin between internal self-sufficiency and amounts of exportable surplus. Serious deviations in either direction can occur because of overresponse to price adjustments and annual variations in weather. Even effectively managed programs may produce surpluses and shortages.

Subsidies, such as higher price supports for small farms, have been used in Greece to alleviate the poverty of farmers who have inadequate resources and limited alternatives. Massive transfers have been made to the agricultural sector through pricing, capitalization of the Agricultural Bank, low interest rates, special services, and many other means. These transfers have not only aided development but have supplemented incomes in this sector, where productivity is low. Special assistance to small farms was a deliberate policy to reduce migration from farms while the rest of the economy was unable to assimilate such migration.

Greek agriculture is characterized by small owner-operated farms, and most farmers sell some commodities in the markets. This exposes most of the rural population to the monetary system, and price supports and other economic programs have direct impact. In contrast, many other developing countries have large farms with a semi-indentured labor force that is outside the economy or consists of a large group of almost purely subsistence farms. In these situations, the owners of the large farms or a separate group of commercial farmers are the decisionmakers. In Greece, economic programs were well adapted to the structure of Greek agriculture.

## Agricultural Credit

Credit to farmers was made readily available through the Agricultural Bank. About 90 percent were estimated to have used it. Local cooperatives acted as representatives of the bank; thus, most farmers had ready access to it. The bank also financed the cooperatives in their various activities that included implementation of several Government programs. Interest rates charged were relatively low, not much above the rate of inflation, and less than the operating costs of the bank.

These costs were high because the bank provided many services unrelated to its credit functions. The Government used the bank to implement many of its programs and



subsidized it for this purpose. The bank was an existing organization with adequate capability, and the specific objectives of farm programs were within its original purposes of providing credit and farm supplies, assisting cooperatives, and promoting technology. The complexity and scale of its operations grew far beyond the level originally anticipated. An organization such as the bank is an important adjunct to development. Especially in the early stages, it can provide a wide range of services. However, in time, its activities can become too diverse, with other objectives eclipsing the primary one of providing and supervising credit; and it can duplicate services provided by other agencies.

### Cooperatives

The basic cooperative law limited the local, or first-degree, cooperative organizations to individual communes. Thus, most of them were very small and ineffective as focal points for local organization and for participation by farmers. Their first program was to provide local offices for the Agricultural Bank; and thus, they were involved in distributing credit, fertilizer, pesticides, and basic household supplies. The real strength in the cooperative movement was in the regional unions -- the second-degree cooperatives. Farmers were represented in these by delegates from the locals; thus, direct participation was not broad in terms of numbers.

The third-degree cooperatives were variously concerned with marketing, processing, storing, and exporting of commodities, and with supplying technical assistance and specialized equipment. Most were involved with a single commodity or a few related ones, and they handled relatively small parts of the output of the products. However, operating at the margin, they were able to maintain prices and set standards. They often participated with the bank in effecting price supports and generally implementing Government commodity programs. Thus, they played an important role in development, yet left room for operation of the private trade.

The central organization of cooperatives was the only effective pressure group for agriculture as a whole, yet the weakness of local cooperatives precluded widespread active participation by farmers.

### Markets and Marketing Institutions

Prevalence of small farms complicated the marketing process. The traditional marketing system was difficult to restructure to meet the needs of expanding commercialism and increased exports. Although individual small farms had little market power, it was supplied to some extent by third-degree cooperatives. The Government substituted for it through price supports for many commodities. Quality control was difficult to attain with small farms, especially in meeting export requirements. These are problems encountered by most developing countries, yet they receive too little emphasis in planning.

### Transportation

Improvement of the road system received early attention. This facilitated distribution of modern inputs and marketing of agricultural products and contributed materially to rapid growth. Better roads made the rural people much more mobile and facilitated communications. However, the road system hardly met the standards needed in the latter stages of development to maintain the quality of perishable products for urban markets and export.

## Fertilizer

The supply and distribution of fertilizer was a virtual monopoly of the Agricultural Bank, and much was distributed as loans-in-kind through the lending and distribution facilities of the cooperatives. The amount made available to the individual farmer was determined by the bank technician who processed the loan. This illustrates a unified system that insured wide distribution of fertilizer by (1) making it readily available to all farmers and subsidizing internal distribution costs, (2) financing its use, (3) allocating the supply, and (4) subsidizing the cost to maintain favorable prices for farmers. As a result, most farmers used fertilizer and about two-thirds of the cropland was fertilized in 1967.

## Land Resource Development

Greece is representative of developing countries with limited opportunity to expand the area of cropland. Some of the best soils in the country were brought under cultivation by drainage and flood protection. Since these measures involved relatively inexpensive development, they were given early priority. Small private irrigation projects were also relatively inexpensive; and they were partially subsidized, particularly when installation of wells and pumps was involved. Later, major irrigation projects were started, but priorities were not clearly defined; thus, many projects were started and few were completed.

The productivity of irrigation was enhanced because it permitted sequential cropping, which is important in Greece: barley and wheat followed by corn or by vegetables, and a few other combinations. In effect this expands the landbase. Irrigation particularly benefited major industrial and export crops.

Before World War II, land reform was accomplished to accomodate refugees from Turkey; and as a result, Greece had many small farms that had become so fragmented as to impair development and modernization. However, they functioned as reservoirs for persons lacking other economic opportunities. Some programs of consolidation and farm enlargement have not yet been effective on a significant scale. Consolidation is essential to fuller development of irrigation, to mechanization, and to realization of other objectives.

## External Assistance

The pattern of external assistance was almost unique to Greece, among the developing countries. In 1945, immediately after being freed from German occupation, Greece benefited from heavy support successively from England and UNNRA; and during 1948-52, it received aid under the Marshall Plan. The assistance was large (as much as 10 percent of GDP in some years), and it was mostly in the form of grants. At first it was primarily for reconstruction of an economy devastated by war.

In 1949, a long-term development program was advanced, which was gradually formalized and activated during the following 5 years. In 1953, the Mutual Security Act succeeded the Marshall Plan. In 1955, the P.L. 480 program was initiated; loan capital assistance was added as a feature of the Mutual Security Act and was continued after 1962 under the AID program. At the same time, the scale of assistance was being reduced, in total amount and relative to GDP, which was increasing rapidly. Assistance was around 3 percent of GDP from 1953 through 1957; it declined to 1 percent until the program

ended in 1965 and 1966. Greece benefited from and was able to assimilate over 20 years of external assistance, with very heavy initial inputs that were largely grants.

The assistance programs in most developing countries have not had such large, initial inputs; they began in 1953 or later; they were initially at low levels that have increased only moderately in recent years; and they were largely made up of loans from the United States, third countries, or international agencies. The capacity to assimilate heavier inputs would need to be determined on an individual country basis.

### The 5-Year Plan

The systems approach to planning in Greece is very relevant to the problems of other developing countries. Policies and programs that have evolved over the past 20 years have been means to the ends now attained, and they are of value only as they pertain to the future. New and ambitious goals have been set in the current 5-year plan. While the objectives are high compared with those of many other development plans, they may prove to be entirely feasible. Levels at which specific goals or targets of such plans are set should be realistic. They should be high enough for significant progress to accrue to large segments of the economy and to require effective management of resources, yet not so high that a significant shortfall would discredit the planners and executors of the plan.

### General Objectives

Aside from the growth rate target of 8.0 percent for the general economy, the most significant objective is filling 110,000 new employment opportunities by transfer from the agricultural sector. This would, in effect, provide other employment for about 10 percent of the farmers. True, it is only a small beginning in making the occupational adjustments necessary to provide land to significantly increase the sizes of farms for those remaining in agriculture. At this rate of transfer, it would take about 25 years to reduce the rural population by 50 percent. However, accelerated growth of the rest of the economy could shorten this period.

### Agricultural Plan

The growth-rate target for livestock, at 7.6 percent, acknowledges the high income elasticity of demand for animal-derived foods. While the more effective approach would have anticipated the need, the Government is sensitive to the changes that have occurred, and it is planning appropriate adjustments. General restructuring of agriculture according to the principles of comparative advantage, both internally and internationally, is especially applicable to the process of maturing from a subsistence to a commercial economy, and for continued growth of exports.

Among major institutional changes planned, the Agricultural Bank is to be reorganized as a credit institution. It will divest itself of its technical services (which will be merged with those of the Extension Division), abandon to commercial channels its distribution of supplies, and transfer its supervision of cooperatives to another agency. The bank will implement policy and programs only through the medium of credit.

Reorganization of the cooperative system would provide for the strong locals through which the farmer members can become involved in management, and it would reduce dependence on support and operation from above. At the same time, enough central direction and credit and other support would be continued to enable the cooperatives to assist in implementing price, income-support, and other programs designed to maintain sector growth and assist small farms.



In providing the environment and leadership to establish self-sustaining growth, the Government became directly involved in many economic activities and businesses. It is now moving to withdraw gradually from this involvement in favor of private businesses, including cooperatives. This is in character with the general tenor of the overall plan, which explores every facet of the economy and does not hesitate to propose fundamental changes in policies, programs, and institutions.

### Rate of Growth

How fast a country can grow is an important question, one that relates to its capacity to assimilate increased agricultural output as much as to its capacity to generate it.

During 1947-49, Greece had a rural population that, in a broad sense, fed itself, produced food for the urban population -- supplemented by imports -- and provided traditional exports at a level that had not yet fully recovered from wartime disruption. Any increases in output that moved in the direction of restoring prewar production levels were easily assimilated in the reconstruction of an established system.

Greece next entered an import substitution stage. The country built on already existing systems and facilities and expanded their capacity. Increased output fed into established distribution systems in consuming centers -- systems that would grow with the consuming population regardless of sources of supply. Growth at this stage was assimilated, with a well-organized development program providing an increased flow of inputs.

As changes in the composition of domestic demand became effective, Greece entered a much more difficult stage of growth. Restructuring of production is much more complex than increasing output from the existing organization. New facilities are required throughout the marketing system, in no small part because the shift tends to be from staples to perishables, from the familiar to the unfamiliar -- with increasing volume. Specialization perhaps simplifies production problems, but it complicates marketing because the need for a two-way flow assumes increased importance. Producers who specialize expect increasingly to buy commodities for their own consumption that earlier they had produced for themselves. Their need for inputs continues to expand. This phase requires coordinated and simultaneous action on several fronts. Points increase where frictions, lags, and slippages can enter. Significant new limitations are thus imposed on the potential rate of growth.

Expanding production for export of traditional and new commodities adds further complications. Special packaging, processing, and transportation equipment is required. Quality standards need to be developed and enforced. Markets need to be developed, some as complex as the association of Greece with the EEC or Greece bilateral agreements with Eastern European countries.

Rates of growth projected in the current 5-year plan seem reasonable, although they have not previously been attained over a significant timespan. Problems are generally recognized and means of overcoming them postulated. Projected growth in agriculture in this period of the plan is favored by investments in land development projects that have not been completed. The possibility of bringing substantial amounts of new irrigated areas into production strengthens the potential for success. If these areas are not given high priority, they may contribute, not to growth, but to discrediting the plan itself. Plans of developing countries must be comprehensive and realistic in their approaches if projected growth rates are to be achieved.

Early in 1970, after the first 2 years under the plan, some information was available on progress. For the agricultural sector, 1968 was a disaster due to severe



drought. Data on production of 11 major crops and five livestock products show a reduction in 1968 of 12.7 percent from 1967 production. Wheat was down 18 percent, and imports were necessary. Cotton and tobacco, both export crops, were off around 25 percent, even though most of the cotton was in irrigated areas. It was also a poor olive year, with output down about 20 percent. Corn and rice both increased more than 10 percent, but barley production was only 58 percent of that for 1967. Output of the livestock products increased almost 5 percent; poultry meat led at 24 percent, while mutton and lamb, and cow's milk held about even.

Recovery was only partial in 1969, only a fair season for crops. The same commodities were at about 95 percent of their levels in 1967. Barley and tobacco recovered to only 63 and 71 percent, respectively. Wheat was at about 95 percent, while olives were practically unchanged from their level in 1968. The livestock commodities continued their moderate increases.

Only some favorable seasons and the willingness and ability of farmers to continue financing inputs at increasing rates will enable agriculture to attain the plan goals by 1972. Reaching these assumes the Government will continue its contributions to development of irrigation projects and other fixed-capital formation. Farmers are unlikely to be able to continue their own investment schedules without strong financial support from the Government.

Nonagricultural growth fell short also during 1968 and 1969. No doubt a significant part of this decline relates directly to shortages of output from agriculture and the weakness of that sector as a market. Capital available for general development is reduced while diversions are made to agriculture, and foreign exchange is used to supplement basic food needs.

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